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[Pages 13-19]

The Climate

Even though, in general, the climate of Central Germany manifests the character of a transition climate from the Atlantic to the continental, in the mountainous region it is subject to changes which vary with increasing elevation. Here, as is the case with both lowlands which lie on either side, the predominant wind direction is toward the southwest. Wind intensity increases in correspondence with increasing altitude.

Yearly average, according to the Beaufort scale: Inselsberg, 3.9 b (71.1 m/sec); Erfurt, 2.9 b (4.6 m/sec).

Also peculiar to the mountains of Central Germany are the appearances of fall winds, and especially of foehn winds, which invariably occur when there is a high-pressure area on the one side of the mountain and a low-pressure area on the other. The winds thus conditioned through such a distribution of atmospheric pressure then blow across in the direction of the mountain crest and undergo a dynamic warming at the drop from the crest to the low-pressure area.

The mean annual temperature of the mountain region of the Thuringian Forest and the Slate Mountains (660 to 983 m) is 4.6° C. It fluctuates between 5.9° and 3.6° C. Erfurt, on the other hand, has a mean annual temperature of 7.8° C.

Likewise, a temperature inversion, a typical mountain phenomenon in the cold part of the year, often occurs in the Thuringian Forest and the Slate Mountains. As regards the Inselsberg, there are 331 inversions to 1,096 readings. An especially typical case such as the following has become the rule.

Example: On the night of 20-21 January 1885 the following minimum temperatures prevailed:

		theoretic	anomaly
Erfurt (200 m)	-23.3° C	-23.3° C	+0° C
Grossbreitenbach (660 m)	-11.9	-25.5	+13.6
Oberhof (805 m)	-8.0	-26.4	+18.4
Inselsberg (916 m)	-5.5	-26.9	+21.4

When, in the winter months, a Siberian high advances tongue-like as far as Thuringia, occasionally remaining for weeks at a time, cold-air masses flow down from the broad, flat upland area of the mountain into the valleys which open toward the southwest and northeast, congesting on the steep undulant limestone wall of the upper Werra Valley and forming their masses as well in the Erfurt basins which are surrounded by peaks. The absolute temperature extremes are lower in the mountains than in both low-lying areas.

#### Absolute temperature extremes

Inelsberg: absolute maximum	+30.2° C
absolute minimum	-24.1
absolute fluctuation	54.3
Erfurt: absolute fluctuation	65.8

Above all, however, the differences between mountains and low-lying areas are manifest in the increase of relative moisture and precipitation.

## Relative moisture

in Erfurt	78%
Grossbreitenbach	84
on Grosser Inselsberg	86

In the mountain region the mean annual precipitation fluctuates between 1,000 and 1,350 mm. At the edge of the mountains it goes down to 900 and 700 mm. With a precipitation of 500 mm, Erfurt characterizes the southernmost point of the arid region of Central Germany.

Botany and Zoology

In their present composition, the botany and zoology of a part of the earth are no longer conditioned alone by the soil and climate; on the contrary, they are also partially conditioned by historical development. In the Pleistocene, the snow-free areas of the mountain bore moss and lichen tundras with Arctic-alpine species which are still present in fossil remains: *Aster alpinus*, *Leucorchis alba*, *Empetrum nigrum*, *Andromeda polifolia*, *Carex pauciflora*, *Centiana verna*, and *Lycopodium alpinum*.

As regards glacial relics from the animal world, to be mentioned are the pygmy owl and the snipe among birds; the Winterlaich salmon and the brook trout among fishes; *Thyreopus lapponicus* and the grass moth (*Hadena gemma*) -- both only in the uppermost, snow-covered regions of the mountains -- among insects; as well as the alpine looper (*Gnophus pullata*), and *Planaria alpina* and *Polycelis cornuta* in mountain brooks. In the high-lying region of the Schmucke Dr. h.c. Fiedler-Suhl established the striking boreal-alpine ground owl (*Agrotis speziola*), as well as montane-subalpine coleopterans: the pitch-black *Leistus piceus*, the *Trechus splendens*, the alpine



*Anthobium alpinum* (in the snow-covered parts), and the *Byrrhus glabratus*. Fiedler also found a southern species of coleopteron (*Agrilus elongatus*) in oaks and oak thickets near Gehlberg at 700 m above sea level.

Due to their damp mountain climate, the Thuringian Forest and the Slate Mountains are a habitat of mountain flora (montane types). However, they also have a series of Atlantic invasions.

#### Atlantic or sub-Atlantic types

*Hypericum pulchrum*  
*Lysimachia nemorum*  
*Senecio spathulifolius*  
*Teucrium scorodonia*  
*Digitalis purpurea*  
*Galium saxatile*  
*Polygala serpyllaceum*  
*Lycopodium inundatum*  
*Sarothamnus scoparius*  
*Calluna vulgaris* (Atlantic in the  
broadest sense)  
*Drosera intermedia*  
*Subularia aquatica* in the  
Plothen lake  
region  
*Sparganium minimum*

#### Montane types

*Lycopodium selago*  
*Melampyrum silvaticum*  
*Trientalis europaea* (montane to Arctic)  
*Vaccinium uliginosum*  
*Lonicera nigra*  
*Ribes alpinum*

*Arunous silvester*  
*Astrantia maior* (montane to subalpine)  
*Campanula latifolia*  
*Centaurea montana*  
*Circaea alpina*  
*Circaea intermedia*  
*Prenanthes purpurea*  
*Ranunculus aconitifolius* ssp. *platanifolius*  
*Poa chaixii* (sudetica)  
*Chaerophyllum hirsutum*  
*Centaurea pseudophrygia*  
*Crepis mollis* (succisifolia)  
*Meum athamanticum*  
*Peucedanum* (Imperatoria) *ostruthium*  
*Phyteuma orbiculare*  
*Sedum villosum*  
*Trifolium spadiocum*  
*Calamagrostis villosa*  
*Thlaspi alpestre* (Mediterranean-montane)  
*Amelanchier vulgaris* (subalpine)

It is phytogeographically remarkable that a considerable number of warmth-adapted types (steppe flora) are also native to the mountains. These are enumerated below in their natural assemblages. They are Pontian, Pannonian, and Sarmatian types which migrated into the river valleys in the woodless-steppe epoch to make still another advance in the xerothermic (dry-warm) phase of the post-glacial period; whereas the more sensitive Atlantic and Mediterranean types migrated first in the damp-warm Atlantic phase. The damp-cool forest climate of the more recent iron age caused the few high

moorland formations on the mountain (Saukopfmoor, Teufelskreise, Siegmundsborg Saar). The oak trunks, acorns, and hazelnuts found below the high moorlands on the snow peaks perhaps bear witness to the forest stand of the xerothermic period on the heights of the central group. The mountain forest determines the predominant character of the landscape with the bright green of the silver fir-beech mixed forests of the lower Hercynian mountain step (up to 750 m), and the dark green of the beech-spruce mixed forests of the upper Hercynian step. The lower forest step is principally abundant in various types and facies in those places where it still forms native stands, as in the wild-life reserves of the Seimberg Forest in the Truse Valley and of the upper Vesser Valley, in damp valley gorges, and in the shady Stromwald of the Slate Mountains. The Seimberg exhibits virtually all variants of the mixed forest: asarum-beech forests, anemone-beech forests, and luzula-albida leafy mixed forests on drier soils; woodruff-beech forests and wild hemp-beech forests on humous, moderately damp soils; deciduous forests rich in touch-me-not (*Impatiens noli tangere*) on very damp, absorbent soils. Groups of *Senecio Fuchsii* and white pestilence wort ascend up to the edge of this forest step. The Schluchtwald and the shady Flusswald of the upper Saale are characterized by *Lonicera nigra*, *Ribes alpina*, *Eupatorium cannabinum*, *Lunaria rediviva*, *Polemonium coeruleum*, and *Prenanthes purpurea*. The leafy, liverwort-rich montane flora of the Landgrafenschlucht and the Drachenschlucht harbored biflora between fern fronds and "Goldmilz Viola." Everywhere on the forest strips the characteristic "forest" plants are in evidence: *Digitalis purpurea* and *Epilobium angustifolium*, and *Deschampsia flexuosa* in surging, golden-yellow stretches of open ground. Stretches of open ground covered with *Chaerophyllum hirsutum* and *Arunceus silvester* accompany the forest brook; in the Slate Mountains

along individual forest brooks on the south side of the mountains the *Mimulus leteus* grows along with the *Astrantia maior* and the *Thalictrum aquilegifolium*, and with *Rumex arifolius* along brooks in the heights. Growing on Zechstein limestone and dolomite (e.g., near Liebenstein), the deciduous forest retains much of the character of the hill step of the piedmont: *Cephalanthera grandiflora et rubra*, *Arum maculatum*, *Lilium martagon*, *Allium ursinum*, *Sanicula europaea*, *Centaurea montana*, *Dentaria bulbifera*, *Daphne Mezereum*, and *Helleborus viridis*.

If we climb higher, we see that the spruce forest of the upper Hercynian step predominates at altitudes from 750 to 800 m up to the highest peaks. There are only a few types of spruce forests in the facies of the bilberry or of *Calamagrostis Halleri* with thickets of numerous ferns and lycopodiaceous types (*Lycopodium alpinum* near Oberhof, Gehlberg, Suhl, Goldlauter, etc., as well as the alpine-montane *Polystichum lonchitis* near Goldlauter (sole habitat in Thuringia!)). The previously-mentioned upland moors of the mountains also belong to this level. Ordinarily, it is bog-moss-rich heath assemblages in which *Calluna vulgaris* prevails in the vegetative assemblages of typical upland-moor plants which to an extent have a relic character: *Andromeda polifolia*, *Empetrum nigrum*, *Vaccinium oxycoccus*, *V. Myrtillus*, *V. uglinosum*, *Carex pauciflora*, *Eriophorum vaginatum*. *Scheuchzeria palustris* grows in the closures of the upland moors. The jutting porphyritic rocks cover the tundras and lichen steppes ("Landkartenflechte" and "Nabelflechte"), the block and rubble fields of Lower Silurian quartzites of the odoriferous, reddish *Trentepohlia lolitha*, e.g., in the Goeritz region and Steinbaechlein near Steinach. Mountain meadows with remarkable types (below) extend in soft green along the woodland "island formed by conversion into arable land:

*Meum athamanticum*  
*Trollius europaeus*  
*Arnica montana*  
*Centaurea pseudophrygia*  
*Crepis mollis*-(*succisifolia*)  
*Phyteuma orbiculare*  
*Orchis mascula*  
*Orchis sambucina*  
*Leucorchis albida*  
*Coeloglossum viride*

On mountain meadows on the Schmucke and other places:

*Imperatoria ostruthium*  
*Mulgedium alpinum*

In more moist locations:

*Trifolium spadiceum*  
*Geranium silvaticum*

At moist, boggy places the mountain meadow renders adaptable the growth of mat grass in which *Nardus stricta* dominates and grows along with *Parnassus* grass (*Parnassia palustris*). Blooming in the form of many deep-blue stars is the *Gentiana verna* -- a glacial relic -- on the mountain meadow near the Torfhaus north of Oettersdorf (Kreis of Schleiz), and near Steinach.

An accumulation of still water occurs only on the broad Slate Mountains on the clayey fault plane of weathered Paleozoic slate. On one area of 200 m<sup>2</sup>, 400 larger and smaller ponds were counted in the Plöthen lake region. Here, in conformity with the laws of nature, occur typical filling-up phenomena along with considerable phytogeographical migrations of Atlantic types:

Reed stands with *Phragmites*, *Typha*, *Scirpus lacustris*, *Acorus calamus*, *Equisetum limosum*, *Cladium mariscus*, and *Hippuris vulgaris*.

Rush stands of reed grasses or sedges, bur reeds, marsh trefoil (*Menyanthes trifoliata*); and the three varieties of sundew (*Drosera intermedia*, *longifolia-anglica*, *rotundifolia*).

Aquatic-plant stands: aquatic pond weed (*Potamogeton natans*), water lily (*Nymphaea alba*), *Lemna* varieties.

Submersed-plant stands of pond weed, water milfoil (*Myriophyllum verticillatum*), bladder wort (*Utricularia vulgaris*), and the Atlantic *Sparganium minimum* (the smallest bur reed).

Particularly remarkable are the *Littorella lacustris* meadows on the Finkenmuehl pond -- a stand of the snake weed (*Calla palustris*). In the filling-up area near the Moos Pond and the Poermitz Pond, *Hydrocotyle vulgaris*, *Peucedanum* (*Thysselinum*) *palustre* -- as well as *Pinus Mughus* ssp. *uliginosa* on the former pond -- have significant habitats as offshoots of the Vogtland area (Schwarz, A., Kreuzweg der Blumen [Crossroad of Flowers], 1952).

In contrast to all the aforementioned floral assemblages, which thrive in more or less moist places, the more insular thermophil relics, steppe heaths, and rock heaths appear in the forest "sea" on sunny, steep places of water-permeable, warm-dry Paleozoic clay slate, knollenkalk, dolomite, and diabase, as well as in the naturally charming Carbonic limestone and diabase gap of the Saale on the geologically famous Böhlen near Saalfeld, on the Heinrichstein, and near the lead drillings.

## Xerophilous types on the Bohlen

*Allium senescens*  
*Amelanchier vulgaris*  
*Anthericum ramosum*  
*Asperula glauca*  
*Aster alpinus*  
*Bupthalmum salicifolium*  
*Bupleurum falcatum*  
*Chrysanthemum corymbosum*  
*Coronilla coronata*  
*Cytisus nigricans*  
*Epipactis rubiginosa*  
*Erysimum odoratum*  
*Erysimum crepidifolium*  
*Geranium sanguineum*  
*Libanotis montana*  
*Peucedanum Cervaria*  
*Teucrium chamaedrys*

## Xerophilous types on the diabasic rocks of the upper Saale Valley

*Anthericum Liliago et ramosum*  
*Cotoneaster integerrima*  
*Geranium sanguineum*  
*Hieracium caesium*  
*Lactuca perennis*  
*Libanotis montana*  
*Festuca glauca*  
*Melica ciliata*  
*Stipa capillata* (between Saalburg and  
 Ziegenrueck)

(On shady diabasic rocks, a cover of *Saxifraga decipiens*)

The mountain forest was once very rich in wildlife. In the early Middle Ages, bison, aurochs, and elk lived here, and as recently as the eighteenth century, great wolf hunts were conducted in the Slate Mountains. The last bear was killed in 1797 near Kursdorf; the last lynx in 1819 near Stutzhause. Frequently encountered are deer, hare, squirrel, badger, fox, pine marten, "Edelmarder," stag, and wild boar. Among the birds of the forest, the following can be mentioned: jay, carrion crow, song thrush, missel thrush, nuthatch, cuckoo, ring dove, wild pigeon, woodpecker, wood owl, horned owl, woodcock. Mountain cock is still abundant, e.g., on the snow-covered upland moors, but the hazel hen is extinct (still mentioned in 1850 in Brueckner's Landeskunde /Geography/!). Also extinct are common raven and "Steinroetel." Infrequent pairs of horn owls still exist in the Slate Mountains. The woodlark sings, the tree titling warbles, and the goatsucker hums and chatters in bare spots of woods. Up to the peak of the mountains fly bullfinch, spruce crossbill, hedge sparrow, fir titmouse, crested titmouse, the two goldcrests, missel thrush, song thrush, blackbird, redstart in rocky places, robin, wren, peregrine (Schmueck trenches, Doerrberg, and other places), common buzzard, and the rare chicken hawk (e.g., Doellberg near Suhl). The thick-beaked fir jay breeds in the mountains, and the Siberian fir jay is a transient visitor (perhaps already a brooder?).

Some of the striking animals of the beech forest are the "Waldschwirrvogel"; among butterflies there are the "Nagelfleck," the notodontid moth, and the "Buchengallmuecke." Regular inhabitants of individual forest trees are the bark beetles (e.g., the "Buchdrucker") and the weevil in spruces; and the fir weevil, the fir psocid, and certain wood wasps in white firs. In mountain



brooks the otter is still existent in small quantities (e.g., Schleuse); whereas the "Noerz," which was reported as still existent in 1800 in the upper Werra, has become extinct. Present in springs and swiftly-flowing mountain streams is a remarkable stone fauna of flat worms; "Muetzen" snails; "Wassermilben"; amphipods; and the larvae of ephemerids, caddis flies, "Kribbelmuscken," crane flies, and the above-mentioned glacial relics of the alpine *Planaria alpina* and *Polycelis cornuta*.

[Pages 26-28]

The mountain industry of recent times is often characterized by a complete structural change. In the nineteenth century, pig-iron production migrated westward to the coal and iron deposits. Only on the Stahlberg on the Mommel, on the Hohe Klinge, near Schmiedefeld (in the region of the Kreis of Neuhaus) in the Silurian thuringite and chamosite zones, and near Grosskamdorf is mining still remunerative. Metallurgical plants and ironworks have disappeared and only in the Max Metallurgical Plant of Untermellenborn is the smelting of the last domestic and imported ores conducted on a large scale. Today the iron industry of the mountains is a soil-orientated manufactured-goods industry, labor-oriented and soil hereditary:

- (1) as firearms industry in Suhl and Zella-Mehlis with factories for deluxe weapons, hunting rifles, etc.
- (2) as precise mechanical industry, representative above all in Zella-Mehlis, and arising from the weapons industry
- (3) as small-ironware industry in the Kreis of Schmalkalden, in Bad Liebenstein, in Steinbach
- (4) as Ruhlra industry (clocks, electrotechnical and armature industry)

(5) as machine industry in Saalfeld, Ruhla, Suhl, Schmalkalden, Waltershausen, Friedrichroda, Finsterbergen, Ohrdruf, Ilmenau, and Langewiesen.

After the glassworks made the transition to coal firing (1860), this industry relocated at the mountain margin (Schleusingen, Ilmenau). The glass industry can be broken down into large enterprises (hollow-glass works which produce hollow glass, tubes, bottles, etc); independent artisan enterprises which produce glass instruments, thermometers, incandescent lamps, and insulating glassware; and cottage industry which produces Christmas-tree ornaments, toys, glass artificial eyes, and pearls. The cottage industry is localized in Lauscha and its environs, and is distributed about the other two glass centers of Grossbreitenbach and Ilmenau-Stuetzerbach. The porcelain industry is today likewise soil-aliented. It imports from outside both its raw materials and its fuel (stone coal, brown coal). However, it is labor- and trade-oriented and exports light goods of the greatest diversity, crockery porcelain, deluxe porcelain, electro-technical material, and doll heads for the toy industry. It is principally distributed throughout the Slate Mountains. Great changes, made of necessity in order to conform to the changing tastes of the day, have occurred in the Sonneberg toy industry. In 1740 the transition was made from wooden toys to paste; in 1814 the transition was made to papier-mache; later the transition was made to the production of dolls and material animals. Competing with Sonneberg are many localities of the latter's hinterland from Steinach to Eisfeld. The toy industry introduced in 1816 in Waltershausen was a nonlocal provisional industry which had been relocated here after the decline of the textile mill which itself had arisen as a provisional industry after the Thirty Years' War. The Ilmenau toy

industry arose from the local pottery industry in the middle of the previous century, producing figures of terralith and terra cotta, and finally specializing in woolen toys. The still younger toy industry around Ohrdruf arose from the old woodcarving industry in Ohrgrund. The nonlocal, trade-oriented textile industry of the Franconian Slate Mountains (with the city of Hof, the Bavarian "Manchester," as the center) became in the course of centuries a home industry which has long been such, as is the case with the Sonneberg toy industry.

The stone industry of the mountains is marked by diversity. The leading individual industry is the slate industry which has been worked since the Middle Ages near Sonneberg and Lehesten. Especial applicability is exhibited by the Carboniferous slate of the Loquitz Valley and the environs of Lehesten, where the world-famous roofing-slate quarries are located. The pencil-slate industry has its center in Steinach where, on the Fellberg, the VEB Volkseigener Betrieb -- people-owned enterprise of pencil-slate quarries is located. Here, as well, the whetstone industry has its last stand. Hard stone, such as granite, granite gneiss, porphyry, diabase, melaphyre, greywacke, is mined at numerous places. Mining of stone coal is still limited to the Neuhaus-Stockheim Permian trough.

To a certain extent, both world wars have of course adversely affected the economic life of the forest, and numerous localities have developed into summer resorts along with the long-existent watering places. These resorts are being visited by increasing numbers of workers from the industrial region of Central Germany. Likewise, winter sport has found popularity everywhere and has experienced an increasing number of visitations in recent years.

The type of settlement is naturally conditioned by the topography. On the plateau of the Slate Mountains there have arisen villages with wide streets and a common in the center. Their field distribution occurs in the great stretch of fields on the Thuringian side of the Slate Mountains. The Flur was divided into only a few individual strips. There is a strip of land on both sides of the village street; the other lands are scattered in the Flur. On the Franconian side of the Slate Mountains the villages having commons exhibit the radial-hide field system which is grouped around the settlement. In the V-shaped valleys of both mountains there arose row villages with a crosswise hide field, i.e., field strips running parallelly to the village street. In the more level mountain valley of both mountains there arose forest-hide villages with distribution of the fields into garden, field, and forest hides behind every farmstead.

As regards their topographical conditions, there arose the possibilities listed in the settlement scheme given below. A locality either purely manifests only one topographical site or a mixed topographical site, each in accordance with the conditions of the plateau, interstream plateau, synclinal valley, or V-shaped valley, e.g., sloping plateau, marginal plateau, saddle plateau, interstream-plateau spur, meandering V-shaped valley, etc.

NO	SETTLEMENT SCHEME
1	sloping
2	marginal
3	saddle
4	spur
5	talus
6	mountain peak

NO	SETTLEMENT SCHEME
7	source trough
8	meandering river
9	bifurcated valley
10	valley mouth
11	margin of mountains
12	fault pit

Pages 31-53

#### B. GEOGRAPHICAL EXCURSIONS

##### 1. The Graefenthal Longitudinal Valley--From Schmiedefeld to Graefenthal and Lauenstein

From the mining settlement of Schmiedefeld through the "ceramic longitudinal ridge" to Graefenthal and Lauenstein.

Schmiedefeld, a cross-shaped village with a common on a sloping plateau, and field hides on Silurian leather slate -- "high, free, and extensive" up to the Fichtelite Mountains, but also "naked, thin, and wintry" (Brueckner) -- owes its origin to the rich Erzsegen (Schmittfeld (1414) on the grubbed-up field of the forest smithy). Iron mining is still remunerative today, and until 1861 vitriol and alum were mined in nearby Schwefelloch. Also native here was the pitch-making industry at the pitch huts in the environs, the gathering of fragrant mountain herbs, and the preparation of balsam which in early times had represented an active trade. Later, the ingenious population turned to the turning and painting of porcelain, to trade in glass and porcelain, and above all to match manufacturing. They also turned to mining, which was carried out in the so-called upper ore bed. The latter begins on the Graefenthal-Geiersthal fault and ends in the Varistian fault strikes near

Reichmannsdorf. According to the reconnaissance of the map,  
Graefenthal manifests the following profile:

Hanging wall: leather slate.

13 to 20 m of the upper chamosite bed (only this one  
is mined); therein the quartz-rich thuringite  
zone,

18 to 20 m, quartzite,

0.5 to 2 m, lower chamosite bed.

Basal part: pencil-slate.

The chamosite and thuringite are oolitic iron-alumina silicates.

The phosphorus content of the ore, caused by animal organisms,  
is quite remarkable. In connection with the renewed working of this  
valuable deposit, the famous bibliographer Joseph Meyer of  
Hildburghausen made noteworthy contributions in the period 1845-1856.  
After his death, the Maximilian Metallurgical Works took over the  
working. At the present time 380 miners are employed here. In  
the roasting furnaces which are located 1 km distant, carbon  
dioxide and water is removed from the ore. This signifies a 15 to  
20% loss in weight, as well as the saving of freightage space and  
costs. The calcined ore is smelted with lime-rich Zechstein ore  
in the Maximilian Metallurgical Works at Unterwellenborn.

A view of the Wallendorf longitudinal valley: As a row village  
at the confluence of two narrow V-shaped valleys in the resistant  
Phykode slate (lower Silurian) in the V-shaped valley bifurcation  
lies the village of Wallendorf whose name has evolved from "Walldorf."  
The Orlamuend counts permitted the land to be made arable here as  
well as in Graefenthal, and as early as 1279 Otto von Orlamuende  
gave one-fourth hide to the cloister of Oberweimar. The first  
colonists were forest peasants and woodworkers. But only after

the appearance of mining and the iron industry did the locality begin to blossom and become a market town. There was formerly a refining furnace in the village, as well as a wire plant; a tilt-hammer plant down the valley on the Lichte; a smelting plant ("Blaufeuer" [see Note]) -- the Bockhammer (inexistent since 1842) -- on the upper Bock; a tilt-hammer plant with a smelting furnace on the lower Bock; a rolling works in Teich; an ironworks in the Piesau region. In 1622 a glassworks arose here. Glassworks and glass-processing industry still have their center in Piesau. In Wallendorf, through the purchase of real properties, there arose a manorial estate (hereditary estate), whose owner (Hammann), along with Gotthelf Greiner, the subsequent founder of the Thuringian porcelain industry, founded a porcelain factory here in 1763, which at first utilized the kaolin-rich decomposition products of the quartz porphyry on the Mittelberg and the Hohe Lass.

[Note]: Cf. footnote on page 68 original.)

Toward Taubenbach, a small settlement (hamlet) in the sloping plateau (mentioned as early as 1279), there was a porcelain factory of considerable proportions which had arisen in 1840 from a stone-goods factory (founded in 1830). However, it was closed during World War II and used for other purposes. Between the reservoir and the railroad station, the Graefenthal-Geiersthal fault intersects, separating here the phylite slate from the Middle Devonian tentaculite slates [see Note below]. Down in the Schwefelloch in the lower graptolite slate, where the Morasina vitriol mine had represented for centuries (until 1861) a vitriol and alum-slate industry, the graptolite-containing alum slate (body chambers of lake polyps) was mined here, and exposed to damp air so that it would oxydize. Then it was leached on wooden

leaching platforms. The leached material was processed for alum (for the textile industry); the pure-clay-poor alum slate was processed for vitriol. According to B. von Freyberg, the local vitriol production in the period 1824-34 amounted to 2,017 centners at a value of 20,862 guildens. The infiltrating waters which course on the crevices and clefts of the abandoned mines have produced here, as well as in the "Caves of the Fairies," colorful iron-phosphide sinter formations. Here, an iron-sulfate-rich "vitriol source" likewise appears. Now, through the narrow V-shaped valley of the Grossenbach in the Lower Silurian leather slate, to Gebersdorf, where, shortly before this locality, the lower graptolite slate and ocherous lime once again crop out.

(Note 7: Tentaculite slate is named after microscopic, bag-shaped pteropod Tentaculites of the Devonian sea.)

Gebersdorf (Gäbirndorff, 1414), a forest-hide village in the V-shaped valley on the Gebersbach, was formerly called Fuhrmannsdorf, the carters of which transported slates, pencil slate, vitriol, and alum to Bremen, Hamburg, Königsberg, Magdeburg, Nuremberg, and to the Rhine. The somewhat looser, warm, and nutrient-rich soil of the tentaculite slate permits farming; while the mountain and valley meadows permit a considerable amount of livestock raising. Employed in the nearby ocher mines, and later in the porcelain factories of this longitudinal ridge, the poorer people were once table-slate, slate-pencil, and whetstone makers. On the southwest slope of the Stachelberg we pass the trough of the Upper Devonian Cypridina slate [see Note 1], which crops out here as on the uppermost ledge of the exposure of the small-nodule kramenselkalk [see Note 2]. There where the Sommersdorf road ends, upwarping black slate crops out from the Stachelberg. Then there again occurs Cypridina slate, then one



of two blocks of leather slate which are bounded by two Varistian-like striking faults; while shortly before the wire plant there is Phykoden quartzite which is broken up in quarries. From here, we proceed upward to the Steinbach region which manifests a valley constriction and a swell where the strongly-resistant quartzite is surmounted. The deeply-imbedded wagon tracks of the road which approaches from the right can evidently be traced to the old Nuremberg -- Leipzig trade route which occasionally took here the ascent to the Saalfeld heights. Past the tentaculite slate, we proceed to the Kalkhecke on ocherous lime (knollenkalk), which occurs morphologically and which can be recognized by its yellow-brown weathering coloration, as well as by the richer limestone flora which is conspicuous here in the montane step: *Actaea spicata*, *Anemone silvestris*, *Aquilegia vulgaris*, *Cephalanthera grandiflora*, *Fragaria collina*, *Gentiana ciliata*, *Ophrys insectifera*, *Orchis ustulata*, *Sanicula europaea*. At certain places in the Steinbach region a deep weathering of the ocherous lime into ocher has occurred, so that in consequence it is mined as coloring earth. On the Hercynian fault, the ocherous lime suddenly erodes. Varistian-like, several diabasic veins trend toward Grossneundorf in the region of the lower graptolite slate.

(Note 1: Cypridina slate is named after the small shells of Cypridina.)

(Note 2: So-called because of the holely appearance due to the weathering-out of knollenkalk, so that these limestones have the appearance of ant-eaten wood. In the Rhineland, ants are called "Kramenzeln." Thus, kramenzelkalk is a designation of the Rhenish Devonian.)

Grossneundorf is a water-source, extended village running parallel to the road. It has radial-hide field distribution on a plateau-source trough on the Nuremberg-Leipzig trade route. It has a stately church on a spot overlooking the village, and a mother church with a parish of considerable extent which at one time extended to the Pennsteig and beyond (Spechtsbrunn, Hasenthal, Hohenofen) to Wallendorf. As in Gebersdorf, the local population consists of forest peasants, forest workers, and factory workers (formerly, also carters) who made a business of supplying fresh horses to those who made the tedious ascent up the mountain.

Now, to the brick kiln, still located principally in the tentaculite slates which extend to the Slate-Mountain-trending fault in the lower graptolite slate. At the brick kiln, the eluvial loam of the Middle Devonian argillite of the Spitzberg was formerly burned in the making of bricks. Below the brick kiln, in the valley of the Steinbach in the region of an Ore-Mountain-like or Varistian-like striking stress of Phykoden quartzite, we observe a swell formation and a valley constriction which have been caused by the resistance of the quartzite. Not far below the Hain road which leads to the Wespenstein, near the reservoir of a junction spring which extravasates from a Hercynian fault, the upper ore horizon can be recognized in the floats. Through the shady montane beech forest to the castle! The stone is leather slate which crops out in rocky ledges in the sharp spur between the valleys of the Geberbrook and the Grossneundorf brook. The "festes Hus Greventhal" [Graefenthal castle] lies on such a rocky spur, even partially sunken in the stone. The name "Wespenstein" first appeared during the Thirty Years' War. The Benedictines of Saalfeld had granted their protective patrons, the counts of Orlamuende, the old Slavic

Forest so that it could render arable land. From their castle in Lauenstein they acquired control of Graefenthal, the official city of which they had built for the protection of their "festes Haus zu Greventhal" [Graefenthal castle]. Occasionally they made their residence here; otherwise a representative official remained in the castle to collect toll from the trade convoys which passed through. When the control of Graefenthal fell to the Wettiners, these latter commissioned the hereditary imperial marshalls of Pappenheim as their vassals who, like the above-mentioned representative officials, collected toll from the citizens of Orlamuende. Their other duty was to provide escort on the old trade route from the Sattelpass to the limits of Saalfeld. They were also the lords of the administrative villages of Graefenthal. The view from the estate agent's garden at the protective settlement on the foot of the Burgberg is quite informative. This settlement lies in a broad part of the valley between Mainberg, Wintersberg, and Kindelberg, where the valleys of the Gebersbach, Buchbach, and the Grossneundorf brook meet to form the longitudinal valley of the Zopte, where the old trade route separates from the southern-mountain shallowing the striking longitudinal valley near Spechtsbrunn, again winding upward in the Grossneundorf valley to the leveling of the "Saalfeld ascent." Over the young valley formations, the view sweeps across to the old leveling of the Slate Mountains with their plateau settlements of Grossgeschwenda and Lichtentanne, which afford long-range views.

The crossing of the longitudinal valley was appropriate for a settlement, the importance of which as a barricade and halting place was soon recognized by the citizens of Orlamuende who elevated it to the status of city in 1412. Accordingly, their destiny became inseparately bound with the old road. In early times, four

large inns were established here, and artisans also settled here -- among them Jews along the road running along the Gebersbach Valley (the Judengasse). Above all, the industry of the carters blossomed here. These workers traveled far into the outlying country or conducted the business of supplying fresh horses.

On the old road, the inhabitants of the town were constantly influenced by new incentives for economic activity, for the exploitation of economic opportunities, for the utilization of resources slumbering within the soil. By means of Nuremberg capital, copper and liquation works were established below the town (mentioned as early as 1462). From these works the later ironworks evolved. Via the old road, the cloth-making industry came to Graefenthal; it became a large-scale undertaking. As in Sonneberg and Steinaach, the passing merchants provided incentives for the slate, slate-pencil, and whetstone industries which were represented for centuries as cottage industries, as part-time occupations for the artisans who were primarily employed during the summer, and later full-scale operations in a large factory.

The merchants of the town and of the villages of the environs shipped out that which was produced in the copper and iron works, the products of the clothmakers, and above all, the slate and pencil slate, as well as the vitriol products and coal for fresco painting of the nearby Arnsbach Valley and Schwefelloch. After the construction of the Probstzella-Stockheim-Lichtenfels railroad, the old road became desolate. Around the turn of the century, the slate quarries around Graefenthal decayed due to unfavorable transport conditions, in contrast to the quarries of the Loquitz Valley which were more favored from a technical point of view as regards transportation. Provisional industry, and nonlocal industries -- as was the case

earlier with clothmaking -- made their appearances. There remains above all the porcelain industry which has grouped in the form of many enterprises in the Graefenthal-Wallendorf longitudinal ridge. In the place of the former ironworks, the first porcelain factory made its appearance in Graefenthal in 1861. In association with this industry there arose the cardboard-box and crate industry. The building trade (two factories) produces matrices and border stencils for the porcelain industry. The brewing and milling industries are very old. The cultivation of potatoes, fodder crops, rye, and barley is still remunerative on those slopes of the Schieferhaenge which are not too steep. The lush valley and mountain meadows permit a not insignificant raising of livestock.

Now, down into the town! Under the arch of the church tower, leather slate crops out in its elastic [see Note] facies as rubble argillaceous slate which here contains quartzite rubble as non-native inclusions. ([Note:] composed of rock fragments.)

Over the old school yard to the spacious market place! The characteristic form of the town originated for the most part in the 1850's. After the great fire of 1852 which burned to the ground 252 buildings -- two-thirds of the town -- the town was rebuilt on a spacious scale according to the plan of agronomist Ortmann of Hildburghausen. The lower graptolite slate crops out in a small side street (the Felsengasse) before the stately railroad bridge which spans the Buchbach Valley. And in the cutting behind the cemetery one can observe folded, ocherous Upper Silurian limestone with darkly striped emplacements of graptolite slate. For further geologic studies, the reader's attention is invited to the scientific excursions described on page 124 ff. of the explanations appended to the map of Graefenthal.

Now, down the Coburg road, past the oldest porcelain factory (the Schneider factory which has taken the place of the former copper and liquation works and the ironworks) by the shooting gallery and the lower sawmill, to the Bocksberg, where, before the branching-off of the Marktgoelitz road on the north-south trending disturbance, Carbonic limestone (to the lowermost alum-slate carbonaceous shale, and higher above, to the Carbonic slate, roof slate, and table slate) crops out beside leather slate. The panorama from Bocksberg over valleys and plateaus is quite informative. Tectonics: Two large faulted overfolds extend over the Paleozoic accumulations and have penetrated near to Graefenthal and further eastward. The Ore Mountain-like or Varistian-like folding is of the single type.

That which lies to the west of the Bocksberg disturbance belongs to the Schwarzburg or western Thuringian main saddle; that which lies to the east, i.e., the Carboniferous slate, belongs to the main trough of the Franconian Forest. The pencil-slate zone, for example, strikes Varistian-like, and within this zone there is a smaller strip of Phykoden quartzite, which we have encountered in the Steinbach Valley and near the brick kiln, the axis of the Buchbach Devonian trough, as well as the folds of ocherous limestone in the Graefenthal cutting. The Hercynian or Franconian Forest transverse anticline, which ends in the opposite upland ridge -- the Gehege -- runs perpendicularly to the Varistian-like bearing of the trend. It is older than the Varistian-like folding. It is claimed that the numerous fault lines in the Varistian-like and Hercynian direction, and such that run "in the direction of the resultants of the tectonic force parallelogram" are the resultants of the "interference" of the two faulting systems. (Cf. the geological

summary map of Deubel-Martini!) All the fault lines originally arose in the early Paleozoic epoch (after the folding), and with the exception of the Variscian-like striking fault lines, they were reactivated in the early Mesozoic era. Many fault clefts mineralized in the presence of this rejuvenation.

Two form elements prevail over the landscape: the old leveling which is the consequence of the degradation in the pre-Tertiary and Tertiary epochs, and the young erosion valleys from the most recent Tertiary and Diluvium. They could only have arisen on one of the old peneplains after the mountains had once again been subjected. To the east we again see the plateau settlements, Grossgeschwenda and Lichtentanne, which afford long-range views; to the right thereof, the geologically-famous Hainberg on the Lichtentanne fault, whose granitic magma once induced the contact metamorphism of the folded Carbonic slate, so that the age of this granite could be claimed as being post-Carboniferous; further rightward, the quartzitic residual knob of the Wetzstein (793 m) near Lehesten. The Saalfeld peak and Leuchtenburg now appear on the horizon (between Marktgeolitz and Limbach).

The sunny slate slopes of the Graefenthal longitudinal ridge which receive only 67 cm of precipitation are also phytogeographically remarkable, inasmuch as here genuine botanical representatives of the steppe heath, such as *Cytisus nigricans*, the Mediterranean *Melica ciliata* (Drudenstein!), the eastern *Fragaria viridis* (collina), the *Inula Conyza*, the Pontian-Mediterranean *Digitalis ambigua*, and *Sedum reflexum* assemble with the Atlantic *Teucrium Scorodonia* -- less often with the Atlantic *Digitalis purpurea* (here on the Bockberg). But culturally-geographically informative, as well, is the panorama

from the many arable clearings in the old "Slavic Forest" on the peneplain and in the valleys. The broad plateaus -- to the extent that the slaty, clayey soil is sufficiently light-textured -- and the lush declivities of the valley-like depressions are agriculturally utilizable. Otherwise, still today, the forest claims broad extents of the landscape. Each orogenic process, which has resulted in the cleavage of the Paleozoic accumulations -- and later the mineralization of the crevices, has assumed great economic significance. On the Bocksberg we can observe numerous heaps of deserted slate quarries. The mineral veins have made mining possible at many places. Ironworks, copperworks, and liquation works arose in the above-mentioned longitudinal ridge and its side valleys where the porcelain industry first made its appearance in the nineteenth century. Today, the old Nuremberg-Leipzig trade route has become in part an important automobile route: Steinach to Graefenthal, and to Probstzella. In the Graefenthal-Wallendorf longitudinal valley a railroad has linked the industrial localities of the old administrative district of Graefenthal to the transport-line network.

Now, back to the Zopetal, upward past the "Viehtriebe" shooting gallery, along the Launstein road, where at certain points there is a wire factory and a porcelain factory in the proximity of the railroad station.

On the Gehegsberg, near the Weiss-Kuehnert porcelain factory, the quarries in the grey-green quartzitic Phykoden slate bear witness to the Thuringian (SE to NW) bearing of trend in the transverse anticline of the Franconian Forest.

To Lauenstein! The Thuringian-Franconian boundary marker --



Burg Lauenstein-- crowns the mountain summit (which is etched out on all sides by erosion) of the Phykoden step of the transverse anticline of the Franconian Forest. The counts of Orlamuende cleared spaces for cultivation in the old Slavic Forest and built the castle which was originally intended as a frontier fortress against the Sorbs. It was mentioned for the first time in 1002, and is called Mantelburg by the people. The people of Orlamuende degenerated into robber knights on the Lauenstein, so that Rudolf von Hapsburg left the castle partially destroyed in 1290. At the end of the fourteenth century the eastern, or Orlamuende, building was erected, and in the period 1551-54 the main building was renovated. Later, the castle fell to ruin. Then, in the favor of the former knightly residence, an ingenious castle proprietor made an appearance in the person of Dr. Messmer who brought new grandeur and beauty to the castle and made it a Thuringian-Franconian museum. In a quite early period, under the protection of the castle, Oberdorf arose on the slope of the Burgberg on the plateau-source trough at an altitude of 550 m; whereas Unterdorf extends down to the floor of the Loquitz Valley as a row settlement in a V-shaped valley at an average elevation of 400 m.

Now, into the Loquitz Valley, which is used by the Berlin -- Munich line, downward, past the former Falkenstein smithy, to Probatzella.

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## 2. Schwarza Valley--Oberweissbach--Neuhau-on-the-Rennweg

From Blankenburg through the lower Schwarza Valley, via the  
mountain railroad to the industrial plateau settlements of the  
former balsam merchants and fowlers (today a high-quality glass-  
processing industry), to Neuhaus-on-the-Rennweg.

Blankenburg lies in the spacious valley of the Rinne shortly  
before the discharge of the latter into the Schwarza. It lies  
between the thickly-forested Paleozoic Slate Mountains with a small  
Zechstein band on the one side and the warm-dry, southwestern rocky  
and rubble slopes under the ruins of Greifenstein on the other side,  
where a small block of undulatory limestone is stranded on the  
Hercynian disturbance. The agricultural utilization of the spacious  
valley channel (Rinne-Schwarza-Saale), which latter is also used  
today by an important communication line (Erfurt-Saalfeld), led to  
a dense settlement from the west on the part of the Franks, and to

a lesser degree from the east on the part of the Slavs. Slavic settlements, recognizable by the -itz suffix, and Frank settlements, recognizable by the -dorf, -bach, and -feld suffixes, are mixed together in this valley channel. As a protective settlement at the foot of the castle of the same name (also called Greifenstein), Blankenburg has remained the main settlement. In 1137 the castle is mentioned for the first time as Blankenburg, i.e., Weissenburg, a castle on the brightly shining limestone which contrasts with the black water of the Schwarza ("schwarz-aha") whose dark color is caused by the dusky, slaty rock and by the strong shading of the shore vegetation. Up to the fourteenth century, the castle was the residence of the Schwarzburg counts; it was also the birthplace of a German king -- Guenther von Schwarzburg. In addition to fruitful agriculture in the valley-like depression, a good type of grape ripened on the sunny slopes, so that the Schwarzburg counts and the abbots of Saalfeld and Paulinzella possessed great vineyards here. Mining of copper, silver, and iron was only on a modest scale, and in 1580 a hammer works near Blankenburg was available for smelting. The city (population: 6,600) has vast renown not only as a summer resort and because of its sanatoriums at the entrance to the Schwarza Valley, but also because it is an industrial city in which a wood industry thrives and in which drive belts and tubes are produced. Here, Friedrich Froebel, who was born in Oberweissbach, established the first German kindergarten.

From Chrysopras [see Note], on a marked way, upward on the bushy, phytogeographically-remarkable, steep face, to the Griesbach-felsen. The warm, sunny, Lower Silurian argillite rocks manifest here, in the damper mountain climate, a characteristic botanical assemblage: the pre-alpine *Amelanchier vulgaris*, the Pontian

*Cytisus nigricans*, the montane-Atlantic *Dianthus caesius* (*gratianopolitanus*), the likewise montane-Atlantic *Hieracium Schmidtii*, and the Atlantic *Teucrium Scorodonia*. To the "Toter Fels" with its glorious view of the V-shaped valley of the Schwarza and the densely-forested major mountain folds which extend to the river, to the Meuselbach crest, and to Langer Berg, the dividing boundary between the Thuringian Forest and the Slate Mountains.

(Note) Earlier called Zechenhaus, built by Bergrat Danz who had a preference for Chrysopras (chert colored green by nickel silicate =  $\text{SiO}_2$ ), and later an inn.)

Now, to the "romantic slate quarries of the Schwarza Valley," where the slate is mined today by gallery construction, and down into the valley of the Schwarza. Near the "stone bridge," we can observe in the exposed, soft, argillite chimney rocks of the river bed magnificent kettle holes which are filled with innumerable pebbles from the size of a walnut to the size of a hand. In one 40 cm deep hole, von Wichdorff has found up to one centner of pebbles. When the snow melts, the rock masses become obstructions in the wildly-foaming, raging mountain brook whose stream velocity slows them down, so that whirlpools are formed and the broken-off pebbles wear away kettle holes in the soft argillite. Often, special "trough lines" are associated with the kettle holes. These lines are caused when the waves break upon the rocks and gnaw a trough line through the broken-off material (von Wichdorff). To Schwarzburg, a hide-type settlement with a land-parcel type of land distribution, which originated in the main period of the clearing of forest stretches for cultivation under the protection of the stately castle in the Flussschlingen V-shaped valley. Up to the Trippstein ("Treppenstein"): Indescribably beautiful is the view from its Borkenhauschen over the

"Felstreppen" with blooming *Dianthus caesius* (*gratianopolitanus*) down into the forest valley which is permeated by the peace and harmony of the forest and over the forest "sea" which is interrupted only by the lush alpine meadows of individual clearings. From Taennig to the Rechten, separated from the Trippstein by a V-shaped valley, a small mountain grät extends into the valley-like depression. Upon the anteriormost end of the latter, steeply falling on three sides, gloriously surrounded by greenery, and passed by the course of the Schwarza, i.e., in a pronounced rock valley spur, there sits throne-like in bright red colors the Schwarzburg castle -- the original castle of the princely house of the Schwarzburg -- at an altitude of 90 m over the river. It was mentioned for the first time in 1071 as the "Swartzinburg." Haufendorf is connected to a certain extent to the Schlossberg as a protective settlement. However, the larger part of the town lies on the other side of the river, where the valley broadens near the mouth of the Buschbach. The level character of the Slate Mountain plateau in the oppositely-situated Schabsheide (546 m) is morphologically impressive. The sharply-winding course of the Schwarza, which is also characteristic of the larger rivers of the Slate Mountains, is particularly striking in the Schwarzburg cut-off meander spur from the Trippstein. To the south of the Quittelsberg there is gallery-construction mining in the Lower Silurian slate, which latter is also mined by Meura in the same manner; behind is the Froebel Tower; right thereof, the plateau settlement of Lichtenhain; behind the latter, the Meuselbach crest with a tower; to the southeast, the plateau settlement of Burkersdorf in a single clearing. The Schwarza Valley was settled in the main clearing period of the forests (1050-1300). On the shore of the Schwarza, in the middle of a forest "sea," the blazing fires of the blast furnaces of the old hammer works and wire plants contrasted

dramatically against the sky. Only when the great wood reserves began to be exhausted and the price of wood rose immeasurably, did the old ironworks on the Blechhammer, near Obsthoferschiede, and other places disappear. Centuries ago, gold was sought by the local people in the alluvial and diluvial gravels of the Schwarza which, along with its tributary brooks, comes from the region of the auriferous quartzite of the Lower Silurian. The small gold leaves were laboriously gathered from the gravel by means of panning or washing. Today the valley is still rich in industry. Due to the lavish beauty of its mountain nature, the settlement of Schwarzburg is largely oriented to the "tourist industry." Following the upward course of the river are more than 40 mills (flour, liquation, tanning), box factories, porcelain factories, a factory for ceramic machines (Katz Works), and a glassworks in Oelze.

The Schwarzburg railroad station! There where the path from the Trippstein links to the road to Cordobang, along this streamlet and along the streamlets on either side, there is an outcropping of basal Zechstein conglomerate. Numerous specimens lie about in this area. Also remarkable is the cutting in the Sattelpass Schwarzburg-Bechstet, where, as far as to Bechstet, Zechstein (conglomerate, dolomite, lean clays) lies disconformably (of. footnote on page 122) on the Variscian-like folded Lower Silurian. Via the rail line Schwarzburg-Sitzendorf (a village spread out along one street in a V-shaped valley where candidate in theology Macheleid subsequently founded the Thuringian porcelain industry) -Blechhammer to Obsthoferschiede, a row village in a V-shaped valley from Cretaceous times (first mention of the hammer works of the lords of Obsthoferschiede: 1530).

Via the Oberweisbach mountain railway to Lichtenhain! It is a steeply-ascending railway from the valley station (339 m) to the

mountain station of Lichtenhain (864 m), having a slope of 1:4, a vertical deflection of 325 m and a length of 1,360 m. It is suitable not only for passenger cars, but also for fully-loaded freight cars. It becomes an electrical railway from Lichtenhain to Kursdorf. First commencing operations in 1922, it links the four mountain communities to the great communication network. Lichtenhain is a town on the free mountain boundary and is situated on the old trade route which leads from Erfurt via Arnstadt and Stadtilm to Mellenbach to the "hitching post" on the cleared thicket (Lichtenhay, 1465). The original settlers here were forest workers, charcoal burners, pitch boilers and potash boilers. The names of rivers still indicate these professions (Meilerberg, Pechhuetten, Kohlweg). The trade in oils (medicaments) bloomed here, as well as in the surrounding localities, after the Thirty Years' War. Many of the slate-plate dwellings with baroque garret stories bear witness to the well-being which was brought about by these trades. Today in this locality the main industry is the glass industry: the production of thermometers, lamps for flashlights, and ampules. From the western edge of the village there is a magnificent view of the forest-hide village of Mellenbach in the V-shaped valley. In the fourteenth century barefooted friars penetrated into the densely elm-forested valley landscape (Mellenbach = Ulmenbach), clearing forest areas for cultivation, and founding a cloister (mentioned the first time in 1370). Forest and wood workers settled here, and today the wood industry still has its center here, producing boxes, crates, cases, wood-shaving baskets, root baskets. But here, above all are glass-works and the glass-processing industry (thermometers and medicinal glass bottles), in addition to some still-existent oil (medicaments) trade. On the other side of the Schwarza Valley, on the Barigau plateau (800 m), lie the three plateau settlements of Wilmersdorf

(left), Herschdorf, and Doebischau. Now, to Oberweissbach, a forest-hide village on a plateau-source trough (620 m) which originated in the main period of the clearing of forest areas (mentioned as Wisebach in 1417). Grown out of the latter was the settlement at the hammer works (at the Schmitten); it was called "nider dem Weisspach" [the settlement below Oberweissbach]. From here, charcoal burners, wood scrapers, pitch boilers, and soot burners settled "ober dem Weisspach" [above Oberweissbach] around an estate of the lords of Greussen (apparently near the Karlshaus which today is still called the "Burg"). The unforested mountain slopes on either side are characteristic; these slopes permit only poor cultivation in the presence of the severe climate. The mixture of urban and forest-village architectural styles is a striking feature of the village. The initially quite poor village received its more urban stamp from the flowering period of the oils and medicaments trade which is said to have been founded by the apothecary Mylius after the Thirty Years' War. The introduction has already discussed the blooming period of this soil-oriented industry in the seventeenth and eighteenth centuries. In the nineteenth century this trade was strongly restricted by the authorities, and even for a time stopped entirely, so that the localities again grew poor. Today the production of medicaments is undertaken in several larger factories under the direction of state-licensed apothecaries. New branches of industry allow the localities to blossom again: a porcelain-painting plant, which has developed into a fine art here and in Deesbach, and a glass-processing plant. (The rectory is the birthplace of the pedagogue Friedrich Froebel.) Now, over the thin mountain slope with cultivation areas which have been abandoned in part, the possession of which has been reassumed by Erica, bilberry, red whortleberry, and the typical crevice grass *Nardus stricta* (a



heath with abundant crevice grass). By referring to the panorama described by the teacher Fritz Gaertner, one should study the geographically-informative view of the Slate Mountains and their northern piedmont. The reader's attention is directed to only a few impressive points: the plateau character of the Slate Mountains is magnificently marked toward the south and the south-east. Between spacious valley-like troughs which become V-shaped valleys, there lie interstream plateaus which are more or less leveled. The Froebel Tower stands upon such a plateau. The source troughs are usually settled (e.g., Oberweissbach, Deesbach). Kursdorf lies on a saddle at the foot of the mountain at the Kursdorf summit; its development is similar to that of Oberweissbach: a woodcutter's settlement, oils trade, match industry (the latter has ceased operations and has become the glass- processing industry of today). The villages lying about the Kursdorf summit were formerly known as the "Stellerland" because of the fowler trade which was industriously conducted here. The numerous fowler's huts, clothed with green coniferous branches, are a part of the picture afforded by the landscape. On the other side of the V-shape of the Schwarza Valley are the Barigau heights with the above-mentioned plateau settlements; they are overtopped by the quartzitic ridges of the Langer Berg. Appearing further on the horizon are the porphyritic Haertlinge, Schneekopf, and the Inselsberg. To the north are the undulatory limestone mountains: the Singer Berg and the Riechheimer Berg; to the northeast, the Leuchtenburg; to the east and southeast, the deeply-out Lichte Valley and, behind, the Franconian Forest with the Wetzstein as a quartzitic residual knob; to the south, the beautiful settlement and Kreis capital of Neuhaus-on-the-Rennweg; to the southwest, the Wurselberg and the forest clearing around Wasserberg.

In regard to the succession of vegetation on the leveled interstream plateau of the Taennig: originally there was a forest of red fir and white fir; then a clearing was made and some poor cultivation was conducted only to be later given up; so that the deserted mountain-farming areas regenerated into heath assemblages with an abundance of crevice grasses. Deesbach (1465, originally Tespach), situated on a plateau-source trough, manifests a development similar to that of the aforementioned villages: from many-sided woodwork and fowling to trade with oils (medicinal-herb saps such as balsam, etc.) to glass and porcelain painting and match making for Kursdorf and the local peddling trade, and, finally, to glass blowing which has been carried on here for hundreds of years (surgical glassware, injectors, electric lamps, and, recently, Christmas tree ornaments, as well). On the road which comes from Kursdorf and leads to Neuhaus-on-the-Rennweg, past the meadow cleft-grass which is rich in arnica and baldmoney and which affords a view of the roasting furnaces near the iron mine of Schmiedefeld and of the quartzitic residual knob of Wetzstein; then through the bilberry-spruce forest with upland-moor bog moss assemblages into the damp trough; past the stone quarry in the Lower Silurian quartzite between kilometer marker 33.9 and 33.8, to the clearing called "Fischbachswiese" in the source trough with a single farmstead. Three very young settlements, which lie at the highest position and most inwardly to the mountain, have become one: Schmalenbucho, a hamlet near the "little beech forest," originating from a glassworks in 1607; the plateau settlement of Igelshieb, the highest-lying Thuringian mountain locality (838 m), founded in 1624 from the plants of charcoal burners who found their livelihood in the spoiled wood after a tremendous forest fire and settled here permanently; and the row-settlement of Neuhaus-on-the-Rennweg on a

plateau-valley end which grew out of the Neues Haus (Jagdhaus) which was built by the Count of Schwarzburg in 1673 in place of a fowling floor. Today the three communities form the glass-blowers' town of Neuhaus-on-the-Rennweg (population: 5,000), capital of the Neuhaus Kreis (Cf. page 115 f.)

By rail from Lauscha to Wallendorf. The crossing of the mountains by way of the highest-lying stretch of railway of the entire mountains offers charming views of the landscape. A viaduct spans the Lauschaabach and leads to the Teufelsholz, the eastern slope of which is reached by rail after passing through a tunnel 270 m in length with a curvature of a radius of 250 m. We are here afforded a glorious view into the Steinach Valley and up to the Goeritzberg. We again cross a valley bridge over the so-called "Nasse Delle" [wet dell], and reach the heights of Eller which affords a beautiful view of the glass-blowers' city of Lauscha which rises from the deep V-shaped valley onto the slopes, on one of which the handsome mountain church is picturesquely situated. This view is particularly charming at night when "the industrious glass blowers sit at innumerable gas flames making their artistic glass products," and the shine of the lights reaches the heights of the mountain through the dark night. The trains still huff and puff on the western slope of the Steiniger Huegel past the houses of Oberlauscha, to finally attain the railroad station of Ernstthal-on-the-Rennweg (770 m) and, one kilometer further, Neuhaus-on-the-Rennweg (828 m). From the railroad station of Ernstthal, the rail line leads around the Arlesberg (named after the Arles trees, the sycamore maples) into the "Finsterer Grund" [dark region] over the Ascherbach bridge (190 m long) with its eight arches (affording magnificent views on both sides), through the Finstergrund Tunnel

(220 m long) to the railroad station of Lichte (623 m). The impressive trip ends after we cross a viaduct which excels all other bridges of the rail line -- a viaduct of a considerable height and a length of 250 m at a slope of 1:40 and a curvature of 250 m in radius. (See Figure 3.)

(H. Kandler, Lauscha -- Neuhaus-on-the-Rennweg; Book, Wallendorf, Sonntagsbl. d. Dorfz., 5 October 1913. (Figure 3).)

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Geological maps: (1:25,000) Schwarzburg, Koenigsee, Grossbreitenbach, Steinheid

#### 3. Steinach--Lauscha

From Steinach, city of pencil slate in the morphologically-diverse valley landscape of the Silurian, Devonian, and Carboniferous, to the city of Christmas-tree ornamentation (see Figure 4.).

Rail trip from Lauscha to Steinach. Here, the Steinach Valley runs virtually perpendicularly through the Varistian-like trending strata of the Silurian, Devonian, and Carboniferous. The remains of a presumably prehistoric iron and glass processing

industry which are often found here provide grounds for the assumption that the trade of wanderers was once carried out here. The iron ore was dug up, smelted at a charcoal hearth, and processed in the small hammer works on the brook. Apparently with Nuremberg capital, larger hammer works were established in Steinach and Huettensteinach, as were a milling plant and a refinery. Thus two settlement nuclei arose here: an upper village about the upper ironworks, and a lower village about the lower hammer works (the latter later disappeared and was replaced by the wood industry). In 1683 the plant of the upper ironworks was expanded, so that, in addition to iron, sheet metal was also produced. In 1691 an ironworks union was formed, and in 1700, 100 families migrated here from the Ore Mountains. In 1705 the church -- as the first connecting link -- was built between the lower ironworks, the village proper of Steinach, and the upper ironworks. In addition to boxes and household utensils, the most diverse forms of toys were produced in the wood industry. In addition to the production of table slate from the pencil slate, the latter was also broken up into pencils on the Fellberg in Sonneberg. About 1800 the pencil-slate industry was established in Steinach, and since 1853 this town has developed into the "city of pencil slate." In the second half of the nineteenth century, doll making, papier-mache production, porcelain industry, and glass industry (the latter two served the toy industry) made their appearance. In 1913 the large market between the two settlement nuclei was established, and in 1920 Steinach assumed the status of city. The LBH [Landbau- und Holzbearbeitungsmaschinen, Konstruktionsbuero fuer -- building agency for the agricultural and wood-processing industry] has assumed the place of the former ironworks. The tin and bakelite industry services the glass and

porcelain enterprises. The wood-processing industry, which is principally located in the lower town, produces modern toys; the glassworks produces glass fiber and medicinal bottles; the porcelain factory produces electrotechnical porcelain products. The pencil-slate industry, which gradually incorporated numerous small and large enterprises, is today represented by the VEB Volkseigener Betrieb -- people-owned enterprise/ Slate Quarries. Thus, a large enterprise has been established and furnished with the most modern machines and a magnificent culture hall. The production of slate pencils, table slate, slate slabs, and ground slate has been relocated at a locality which is near to communication. A visit to the "Steinach toy box" -- an industrial exhibition of the many-sided Steinach industry -- is highly recommended (the work of the pine-soot burners, pitch boilers, and charcoal burners of long ago; the development of the wood-processing industry, of the production of toys, of the stone and earth industry, of the glass and porcelain industry).

#### Geological and Geomorphological Conditions

Utilizing the small geological map, we begin our excursion in Untersteinach at the foot of the Weinberg where there is an outcropping of the Lower Carboniferous (Culm): Carbonic limestone which was formerly mined as roof and table slate, and graywacke sandstone which is used as building stone and for the ballasting of roads. Then follows a Variscian-like trending strip of Upper Devonian formation on which Lerchenberg and Hirtenangen are located. Calcareous nodular slate with weathered nodules the size of a nut or fist (Kramenselkalk, cf. Note 2, page 15 transl.) crop out at many points. The whetstone, which has been an active trade commodity since 1806 as grinding stone or "thuringian water stone,"

is produced from the whet slate of the Lower Devonian formation on the Lerchenberg and the Hirtenrangen. The soft argillaceous and tuffaceous slates of the Middle Devonian have been extensively excavated and occur as Varistian-like-striking, valley-channel Middle Devonian formations. On the other hand, the Lower Devonian formations are characterized by compact quartzitic benches (nereite quartzite, named after the worm tracks) and knollenkalk with tentaculites. Bocksberg and Pfeifersberg belong to the easily-weathering Lower Devonian argillaceous slate. From Pfeifersberg we have a good view of the Steinach landscape-- a view which convincingly bears witness to the close relationship between the geological structure and the landscape itself. Then follows the Upper Silurian formation with the easily-weathering ocherous limestone which attained world fame in an earthy condition as "Steinach golden ocher." Herein runs in turn a valley-like depression -- the Silurian valley channel in which is situated the village of Haselbach. Above the railroad, Breiter Berg and the Georgfels lie in the Lower Silurian leather slate which is recognizable by the rock formation, lamellar crumbling, and a leather-brown weathering color. Here, to the west and east of Steinach, the Lower Silurian pencil-slate zone links with the world-famous Steinach pencil-slate quarries. The oolitic iron horizons, which lie above and below the pencil-slate, crop out in the river bed of the Steinach and in ruined mines. The valley constriction indicates another stone overfault. The Phykoden strata of the Lower Silurian are well exposed in the direction of Lauscha. The Steinach Valley runs almost perpendicularly through the Varistian-like-striking strata of the Silurian, Devonian, and Carboniferous (Culm). It is extensively excavated in the zone of the Devonian, so that it was possible for this town to spread out

relatively levelly and to even find room for a large, level market place.

We continue our excursion up the valley and ascend near Georgfels, off the road and over the railroad bed, the Grosser Tierberg (728.4 m) opposite the Goertizmuehle. Weathering and rolling of the steep slope is in evidence from the strongly-crevassed Cambrian quartzite which crops out near the upper roadway (below the heights). Here, a great flare-up had created an extensive burned-out area which is covered with gigantic blocks and masses of course waste. Here, at a slope declivity of 27 to 32 ° -- and further on up to the rail bed, of 35° -- the sheet-flood erosion has caused extraordinary damage: 50% block, 40% course waste, and 10% fine soil constituents, which is more under the shelter of the blocks and the course waste. The entire slope area has always had an abundance of blocks and debris, but before the fire it was almost totally covered by vegetation. As a result of the fire, the vegetation disappeared due to scorching; the humus due to down wash (soil erosion). It is impossible to undertake any clearing operations here, and reforestation has been rendered extraordinarily difficult.

Now, to Lauscha, the world-famous town of glass blowers and the home of Christmas-tree ornaments. In contrast to the Steinach Valley, the valley of the Lauscha is V-shaped and lacking a floor. The houses have been built one above the other on the steep slopes, and the settlement extends lengthwise. No fertile soil for cultivation is present; only stony forest clearings with potato fields exist on the steep slopes, and the poor soil is often subjected to down wash in the presence of heavy rains. Manure has to be carried up to the fields in baskets.



The glassworks which is located in the middle of the locality and is more than 300 years old represented the focal point and basis of economic life. Nevertheless, this industry was not the oldest in this locality; the oldest was in the Marktiegel at the foot of the Pappenheim Berg, having been established in the 1590's by Hans Greiner (the "Schwabenhans") and Christoph Mueller. The glassworks on the Lausche was built in 1597. The cause of the migration of the glass industry from the edge of the mountains (Langenbach) into the interior was the great lack of wood in the border zone. Here, however, in the deep forest areas wood was quite abundant, and there was also ironless sand on the Sandberg near Steinheid, limestone in the foreland, and potash from the wood of beeches. The work was carried out by cheap labor forces. The glassware was sold on the nearby old road which led to Erfurt and Leipzig. Thus, the glass industry of Lauscha was originally raw-material-, labor-, and trade-oriented. The glassworks community rapidly attained a period of blossoming. Throughout Central Europe there was great demand for its products: special glass panes, dishes, goblets, crocks (beautifully painted and decorated with pious sayings). The main customers were the above-mentioned balsam merchants of the mountains, who sold their curative elixirs in glass bottles.

Around the middle of the eighteenth century the bead industry was founded in Lauscha; this founding represented the initial appearance of the cottage industry. The latter developed into an artistic-glass-blowing industry producing ornaments, trinkets, toys, glass wool, glass eyes for stuffed animals and dolls, glass artificial eyes for humans, and animal figurines. Then in the nineteenth century the Christmas-tree ornament trade experienced a vital upswing. Glass tubes are produced in the glassworks of the village.

Here, however, the glassworks industry is solely a secondary industry in relation to the cottage industry which is all-prevailing. House after house represents a little factory. Father and son sit before the gas blower (having assumed since 1867 the place of the oil lamp), and all the other members of the family help out when there is an abundance of orders. For a long time the glass industry has no longer been raw-material- and fuel-oriented, but it is still labor-oriented. It has not migrated into regions affording cheaper raw materials and fuels, but has remained with this race of men to whom the art of glass processing, as well as the love of handicraft, has been hereditary for generations. Highly recommended is a visit to the Lausche glass museum which was extensively reformed in 1952.

Room 1: The glassworks industry from its beginnings to the present.

Room 2: The beginnings of the cottage industry, native arts, porcelain painting, the bead industry.

Room 3: Christmas-tree ornaments and modern artistic glass.

Room 4: Industrial glass (apparatus, glass eyes, glass wool, optical glass, etc).

Room 4: The technology of glass.

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#### 4. Grossbreitenbach--Ilmenau

From Grossbreitenbach to the Langer Berg; then to Gehren  
and Langewiesen; through the contact region of the Ehrenberg to  
Ilmenau.

Grossbreitenbach is a plateau valley-end locality on the  
Breitenbach, which trends Variscian-like in its uppermost course,  
and flows along the junction of the phyllitic and semiphyllitic  
argillaceous slate. Here, in the main forest-clearing period arose  
the settlement of Grossbreitenbach. It was apparently settled by  
the inhabitants of the wasted villages of Witzleben and Schwemmbach  
on the old trade route. The municipal coat-of-arms showing the  
wild man, the castle on the slope, and the key represents the  
locality as the "castle of the Waldstrasse." The bases of its

economic life were to be found in field, meadow, forest, mineral resources, and in the fish of the forest brook. The argillaceous slate of course permits but modest agriculture, but there is that much more animal raising in the valley meadows. Thus, the village was formerly even able to export "forest butter." The wood-processing industry made its appearance here in quite early times. Here, and in the neighboring Altenfeld, there developed a special trade: the trade of the trough makers who once gradually made their way to the east, making troughs and kneading troughs and selling them in the larger cities. Today, wood processing (sawmills and wood factories) and panel painting still have their center here. The traces of old mines bear witness to the fact that alum slate, vitriol slate, ocher, copper, lead, and silver have been mined. In olden times the Bergbach bore 10 mills (flour mills, oil mills, sawmills), but today it has only one flour mill and one sawmill. The blossoming period of this village was also first induced by the flourishing trade of medicinal oils in the seventeenth and eighteenth centuries. The latter trade was said to have been founded here by the apothecary Johann Matthias Mylius. When the profitable medicine trade was stifled by limitations set by the police and other prohibitions, the village grew poor, as did the other "balsam villages" of the forest, until the glass and porcelain industry brought about a reblossoming of Grossbreitenbach. Today the village has five porcelain factories which produce porcelain commodities and employ 700 to 800 people in good times. Predominant is the roughing and smoothing of glass in the VEB Westglas Hollow-Glass Works, as well as in several other factory enterprises, in addition to the production of shipping glass, thermometers, and surgical and chemical pharmaceutical glassware. At times, 3,000 workers have been employed in the glass industry in Grossbreitenbach, Altenfeld, and Oelze.

The Variscian-like striking, isolated quartzite hill of the Langer Berg forms an unusually sharp boundary between the Rotliegendes, porphyritic Thuringian Forest and the Paleozoic Slate Mountains. Bilberry-spruce forests and extensive heaths of *Calluna* and *Vaccinium* cover the resistant stone which has been mined as solid quartzite on the heights. From the Karl Guenther monument on the mountain-pine forested heights one can enjoy a glorious and very informative view of both mountain landscapes and their common piedmont: the handsome mountain-margin settlements of Gehren; Langewiesen; Ilmenau on the sandy step projection of the upper Ilmenau region with its frame of undulatory limestone; Veronikaberg; Reinsberge; Willinger Berg with the Ilmenau short-cut on its eastern slope; the striking Singer Berg; the Schoenfeld with the Barop Tower and, further on, the Goelitzwaende; to the south and southeast, the wide peneplain of the Slate Mountains and its plateau settlements which usually lie in source troughs or valley ends (Friedrichsdorf, Wilmersdorf, Allersdorf, Droebischau) on a broadly Variscian-like striking cleared field, whereas the valley margins are as a rule forested. Of the striking more points of the old peneplain, the following can be pointed out: Lichtenhain, the former halting place on the Gebirgsstrasse ascending from Mellenbach; behind, the cleared, widely-extended interstream plateau of the Taennig with the Froebel Tower; (not much can be seen from the forest-hide settlement of Oberweissbach); Kursdorf in the saddle formation; Meuselbach before the crest of the same name in the source-trough formation; Neuhaus-on-the-Rennweg; Grossbreitenbach; Masserberg; and, finally, the porphyritic residual knobs of the Kinkelhahn, the Schneekopf, and the Beerberg in the Thuringian Forest.

Now, the descent to Gehren. In the gravel plain which

broadens after the termination of the mountains -- a plain which separates the porphyritic Thuringian Forest from the old Slate Mountains. Here, beginning from the former, are linked the V-shaped valleys of the Moehrenbach, the Wohlrose, and the Schobse, between which extensive interstream plateaus make their way. Upon this Pleistocene gravel plain arose the nucleus of the settlement of Gehren -- there where Wohlrose and Schobse form an elongated triangle (a so-called "Gehren") shortly before their junction point and under the cover of a moated castle which simultaneously rendered safe the important roads which cross here: the Ilmenau-Koenigsee road and the Arnstadt-Grossbreitenbach road (the "Waldstrasse"). Up until about the middle of the fifteenth century the castle belonged to the lords of Bernstedt, and later to the counts of Schwarzburg. As recently as the seventeenth century the forest extended up to the mills on the Wohlrose. The name "Wolfsgasse" reminds one that at that time wolves made the environs unsafe. Until 1532 Gehren was a village; in 1549 it became an urban community; but only in 1855 did it become a full-fledged city. The southern part of the city is called "Steinbruch" (earlier "Schenke vor dem Dorf" [inn before the village]) and is located near the "Sichelhammer" and near the pitch hut. In 1679 the stately foundry (the Guenthersfeld) was equipped with a smelting furnace, molding shop, casting plant, locksmith's workshop, bar-iron hammer plant, and shaft furnace. Here, a third part of the city developed. The smelting furnace was worked until 1872; the iron-casting plant (especially of the stoves) existed another 10 years. The Guenthersfeld porcelain factory has existed since 1884. In early days, a sawmill industry and milling were established on the water mountain brooks, and today the largest Thuringian sawmill exists here. In addition, there is the production of wood and toys. Also having

its center here is the glass industry in its two aspects: glass blowing and glass processing (hollow-glass products, crystal glass, isolating glass, thermometers). In addition, there is also the Thuringian porcelain works, fluorite works, and heavy-spar works; graphic trade; a dye works.

Langewiesen (population 5,000) originated from a row village on the old trade route which courses through the alluvial valley plain, the "long dale." The northwestern part of the village lies on the eastern extension of the old Paleolithic argillaceous slate of the Ehrenberg which crops out near house No 14. The market place and the church square lie in the center of the row settlement. The village is said to have been originated by the inhabitants of a wasted village, Ferne-Lohme, which reminds one of the old Flur name "Fernelohmgueter" in the Flur towards Gehren. The village plan was extended by several parallelly-running streets which run perpendicularly to the Hauptstrasse. The long meadow zone runs on both sides in the broad, diluvial ilmenite terraces with extended fields having fish-abundant ponds, to which the densely-wooded landscape links: in the north, Bunter-sandstone landscape; in the south, porphyritic "Oehrenstock." Thus, here, in the main clearing period the following conditions governed settlement: livestock raising on the alluvium deposits; cultivation on the Diluvium formation; wood industry on the densely-wooded districts on both sides; sawmills and the wood industry are still today important. The ore-filled veins of the Rotliegendes mountain landscape at times induce a brisk mining of iron and manganese (brown hematite ore). The iron ore was processed in the Eisen-haemmern, Grenzhammer, Loefflershammer, and "Gottessegen" in the Ilm Valley. In addition, glass smoothing, roughing, and grinding

operations, as well as the porcelain industry, have their center here. There is also the precision-mechanics and machine industry.

The old Eisenstrasse led from Langwiesen over the Rennsteig to Suhl and Zella-Mehlis. In former times Kamsdorf iron ore, in addition to the local iron ores, was transported over this road. We now resume our excursion on the highway to Ilmenau. As mentioned, the northwest part of Langwiesen lies on Lower Silurian argillaceous slate which, further west below the highway between the "Cottessegen" inn and the sawmill, is intersected by a felsite-porphyrific stock. To the right of the road we see before us the Ehrenberg, which played a great role in the history of the geology of Thuringia and was described by Voigt in 1789. At kilometer stone 5.2, a field way leads on beside the highway. The boulders in the field and along the way are contact-metamorphosed argillaceous slates, viz., fleckshiefer and hornblendite rock (Figure 5). Opposite the former spinning mill, on whose site there is today a wood factory, we observe a striking outcrop of the Ehrenberg. Here there is an outcropping of granite which also lies about in innumerable fragments and boulders and which was the cause of the alteration of the old Paleozoic slate when the Paleozoic accumulations were folded, i.e., in the Carboniferous. Those who are especially interested in the geology of the region should examine the small map of Figure 6.

Rightward from the road in the bilberry-pine forest there is an outcropping of felsite porphyry in rock formations at the place where a glassworks and a dye works are located in the valley region. Amphibol stone, which is pervaded by countless granitic veins, is broken up in two stone quarries on the other side of the road near the Schillerhoehe. Then the Ehrenberg goes down again toward the west in the granite region, where, in the liquation works of



Wilhelm Rieht near the point where the road widens, for example, good processing of the granite was carried out in the fall of 1930.

To Ilmenau! The geographical formations of Ilmenau are quite diverse. Ilmenau is situated on the northern margin of the mountains before the Sturm heath where the Ilm flows out from the narrow forest valley and links with the Gabelbach. The town lies at the point where the valley widens near the Ilm flood plain. Geotectonically, the mountain margin forms a knee fold or flexure on the Sturmheide and near Roda. But only the Zechstein fold arm, which is quite steep here, contains a copper-slate bed worthy of mining. The "Mittelfeld" with horizontally-imbedded Zechstein, which is covered with extensive Diluvium formations, is not ore-bearing. Chronicles presume that the first settlement existed in the eighth century. It is said to have been founded as a cloistral settlement on the Ilmen (Ulmen) River (Ilmenaha) by Saalfeld benedictines. But only mining and the necessity of undertaking the service of providing fresh horses on the ascending trade route paved the way for the establishment of a larger settlement which was under the protection of the oldest castle. Later a moated castle assumed the protection of the town, its mining, and both mountain passages:

- (1) Sturmheide-Schmuecke-Goldlauter-Suhl;
- (2) Gabelbach-Einsiedel-Auerhahn-Frauenwald-Schleusingen.

Both passages are presumed to be very old. This is attested by two Roman coins which were found on the second road, the so-called Nuremberg Road.

When the moated castle had degenerated into a robber-knight's castle, it is said that Rudolf von Hapsburg roamed about

from Erfurt (1289-30). According to Voigt (Geschichte des Ilmenauer Bergbaus /History of Ilmenau Mining/, 1821), copper-slate mining was conducted as early as the twelfth century on the Sturmheide. For centuries it remained in full bloom here, so that the mining town remained "a greatly-desired and much disputed locality" in the feuding fourteenth century, until the powerful Southern Thuringian family of the princely-endowed counts of Henneberg extended its domain to the northern margin of the mountains, and, in correct recognition of the strategic location of this time, made it a sally point against the many dynastic families on the northern margin. The Hennebergers became the lords of the mining town which blossomed, as did the mining itself, under their rule. Documentarily, it is attested that in 1564 a weekly 24 centers of copper (in every centner 24 loths of silver) were dressed; in 1618, a total of 1,000 centners of copper; and 2,957 in molecular weight of silver. Still in 1623 the mining brought in a profit of 21,000 thalers; later, however, the mines were closed down. At the same time, the old mountain roads were much used in the Thirty Years' War, and Ilmenau was quite beset with troubles. A second period of blossoming was afforded Ilmenau mining from 1680 to 1739 under the leadership of the mining overseer von Utterodt, so that for the second time 800 miners were often employed. In the period 1693-1702, 245,133 thalers and 22 groschens were stamped from the silver. Then in 1739 the shafts were flooded as a result of the overflowing of the great Manebach pond. All attempts to rejuvenate the copper-slate mining (in 1784 and in the nineteenth century), as well as the attempts of Goethe, were to no avail. The recession of mining ushered in provisional industries in the town: lace making and woolen manufacture (in full bloom here in the eighteenth century). An industrial town developed from the mining town. The porcelain

industry made use of the rich kaolin deposits in the sandy steps of the mountains. In 1852 a hollow-glass works was established which made use of the sand of Martinroda and Oberpoorlitz, the potash of the local refining plants, and the pyrolusite of Arlesberg and Ilmenau. Today the town is the principal center of the glass-processing industry which produces glass instruments and thermometers. An animated liquation-works industry is bound to the water power of the mountain brooks. A large brick kiln north of the town burned the lean Zechstein clays (this kiln is no longer in existence). In Ilmenau, in addition to the above-mentioned industries, there is also toy industry, carved-goods industry, knit-goods and gloves industry; cardboard-box and cigar-case manufacture. Today, mining is still limited to the fluorite. Small enterprises have disappeared. A people-owned enterprise will permit the driving under of entire mines, thus creating new possibilities for mining operations. The advantageous and healthful location, close to the densely-wooded mountains, has finally made possible for the town its development as a climatic watering place and center of prophylactic baths. The prologue to this development was represented not by a spa, but rather by the hydro-pathic institute which was founded in 1838. The latter was further developed through the linking of Ilmenau to the modern communication network (Erfurt-Ilmenau and the extension of this line over the mountains to Schleusingen and Themar). The efficaciousness of this lonely mountain nature had been deeply perceived by Goethe, as is attested by his poem "Ilmenau" of 3 September 1783. The cultural association of the Kreis town exemplarily cares for the memorabilia dedicated to Goethe in the significant exhibitions of the town hall on the market square in which visitors can undertake convincing

examinations of the researches of Goethe in Ilmenau in natural sciences. Due to its location and good communication connections, Ilmenau has also become an important winter-sports center. The development of the town is illustrated by the following:

1809:	1,972 inhabitants
1880:	4,583 "
1930:	14,500 "
1946:	18,600 "

The old town nucleus lies directly before the Sturmheide; a more recent part of the town lies in the northwest of the town; the "Ilmenau-Bad" with its many villas between the Ilm and Gabelbach Valleys on the northeast step of the massif of the Kickelhahn; the newest settlement in the Ilm Valley to the east, southeast, and west of the town. Today Ilmenau is the administrative seat of the Kreis of the same name, and a university town as well (the University for Electrotechnology).

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14. The Zella-Suhl Granitic Fault Pit

The great granitic landscape of the Thuringian Forest lies between Suhl, Zella-Mehlis, and Heidersbach. The granite, once coagulated as deep-seated igneous rock in the Upper Carboniferous, then robbed of its Paleozoic shell, was extensively excavated into a fault-pit landscape, due to its condition of being easily subjected to disintegration, by the source-brook branches of the Lauter and the Lichtenau. On all sides it is encircled by hard, resistant stone of Rotliegendes formation, porphyrites, porphyry, and conglomerates, which in the surrounding mountains rise in part to an elevation of almost 1,000 m. In the northwestern part of this fault pit lies the impressive twin settlement of Zella-Mehlis, which is separated in two halves by the Lerchenberg: Zella St. Blasii and Mehliis. Zella was founded in 1112 as a cloistral establishment by Reinhardtsbrunn which it remained until the period of secularization, whereas the town belonged to the Gotha Georgenthal administration. Since 1919 both settlements have been united into one municipality with a population of 17,400. Its destiny is bound to that of the town of Suhl, for the iron industry is likewise here very old. Already in very early times iron ore was mined in the Suhl mining area. In the nearby environs of Mehliis, albeit on a more modest scale, iron and manganese (psilomelane) were also mined. Then, however, the iron ore was brought from Schmalkalden and Kamsdorf to be smelted here with the limy hematite of the Domberg of Suhl. Later, and into the nineteenth century, the iron-smelting works of Schmalkalden delivered pig iron to Zella-Mehliis. After the creation of better transport possibilities through the building of railroad tracks, the native iron industry

was transformed into an earth-alienated finished-goods industry. The smelting fires were extinguished by iron and steel hammers. Pig iron in large quantities was imported from the Rhineland and Westphalia. Already in early times, Suhl and Zella-Mehlis converted to the production of firearms. In 1563 the Suhl and Zella masters of the tin smithies and metalworkers' plants incorporated into a common guild. Bound to a common destiny, the settlements attained their period of full bloom before and during the Thirty Years' War. The firearms and other metal wares were put on the market by way of the old trade routes which led from Muremberg via Coburg and Schleusingen, and from Meiningen via Benshausen and further over the mountains. With the destruction of Suhl in 1634, the firearms industry of the firearms and armaments center of the empire disappeared. However, in the Napoleonic period, as well as in the two World Wars, it was afforded a second blooming period. Thus, here, as in Suhl, with such alternating periods of good and bad fortune, the firearms industry developed. Firearms of all types were produced as precision instruments: hunting pieces, rifles for target shooting, short rifles, revolvers, automatic pistols, air guns, automatic carbines. After World War I the production of cannons disappeared completely. The invention of the recoil-type gun is one of the many inventions with which the ingenious citizen of Zella, Heinrich Ehrhardt, is credited. Even today, many of his inventions still serve peaceable purposes (the production of oxygen cylinders, et al). Again and again setbacks occurred, so that the further development of the precision-mechanics industry was a necessity. The latter turned out well in Zella-Mehlis, at first producing tuning forks, later bicycle parts and bicycle bells. Since 1905 automobiles, typewriters -- and later, ball bearings -- have been produced.

The prerequisite for this conversion capability was the dexterity, acquired through a tradition of centuries, of the intelligent workers who retained their great love for their forest homeland, so that they were not compelled to forsake that homeland when the wolf was at the door. Here, it was again and again a matter of readjustment for the production of new articles of iron processing, and with the same precision that was utilized in the firearms industry. Nothing is perhaps more characteristic of this conversion capability, as well as of this forest industry which is an industry of quality in the best sense of the word, than the world-famous Mercedes Office Machinery Works which has attained pioneering achievements in its products, e.g., the Mercedes typewriter, the Mercedes-Euklid calculating machines, the Mercedes-Elektra, and which has created a masterwork in its "computing Mercedes-Euklid," which executes five labor processes at one time. An upswing of the firearms and precision-mechanics industry occurred after Zella-Mehlis had been linked in 1884 to the important northeast-southwest line (Berlin-Erfurt-Oberhof-Stuttgart). Of course its natural course should have been the valley of the Lichtenau. However, for reasons of economy, and above all in consideration of the condition of Suhl whose destiny was bound to that of Zella-Mehlis, it included Suhl in its course. A border rail line connects Zella-Mehlis with Schmalkalden and Wernshausen, and also incorporates Zella-Mehlis in the small iron-industry center of the northwest Thuringian Forest. This center has its starting point in Zella-Mehlis and extends along the southern edge over Steinbach-Hallenberg, Schmalkalden, Kleinschmalkalden, Brotterode, Schweina, and Liebenstein.

On 13 and 14 June 1946 Zella-Mehlis was beset by a hurricane-like

tempest. As was feared, the storm devastated 5-b Street, resulting in a loss of one million m<sup>3</sup> of solid timber in the Kreis of Suhl, and favoring an immense increment of bark beetles. In all, the storm laid waste to 2 million m<sup>3</sup> of solid timber. The natural results were the recession of the sources for the considerable settlements in the granitic fault pit, and a manifold floating-off of the parent soil. Reforestation proceeded rapidly, however.

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#### Suhl

This lively industrial town, the present population of which is 25,000, lies on the great marginal dislocation of the mountains. Thus, the northern part of the town lies on granite, while the southern part lies on intermediate Bunter sandstone. Both geographical settlement factors are in interrelation to the marginal crevasse, and this has led to the founding and industrial development of the town. One of these factors is represented by the Ca Cl<sub>2</sub>-containing brine springs, after which the settlement (first mentioned in 1232 as "Sule unter der Leube") was named. It is said that the brine of Suhl was boiled away in the sixteenth century. Today both springs are used for bathing and as a drinking-water source. The other factor is represented by the iron mining which was productive in the seventeenth and eighteenth centuries and which



resulted in a manifoldly-blossoming iron industry on the mountain margin. Here, however, the ore was initially processed for the production of small arms; this soon earned the locality European renown. At that time, a large segment of the population mined iron ore; while the nail-makers, smiths, and armor smiths worked in particular for the southern German knighthood. With the introduction of firearms, they converted to the production of weapons, producing harquebuses and muskets with match locks. There then followed a large-scale export to virtually all European countries. As the emblem of the town, the stone armorer's smithy stands at the well on the market place. But the town's fate was tragic in that this town -- the armorer's smithy of Europe, which supplied all the armies with muskets and harquebuses -- was devastated the most severely of all the towns of southern Thuringia in the Thirty Years' War. The most skilled armorers of Suhl migrated from the town. In the nineteenth century mining disappeared (the final mining attempts were conducted in the period 1853-1857). Again and again the town experienced setbacks, so that of necessity the armor masters and gun makers had to relocate. As in Zella-Mehlis, the further development of the precision-mechanics industry in Suhl became necessary. The rustian-weaving industry came to Suhl as a provisional industry; the bleaching industry was introduced in nearby Heidersbach. New industries made their appearance: porcelain, wood, metalware, and leather. Today the following are representative of Suhl: the Lifting-Device Works ABUS VEB; rifle factories; tool factories; metal foundries; the production of motor vehicles, bicycle and sewing-machine parts, metal products, household appliances, iron furniture; the Fortuna Works MEWA VEB; wood processing; liquation works; leather and clothing factories. All the larger enterprises are people-owned,

e.g., the Simson Works, the Thaelmann Kombinat, IKA Apparatus Plant. After the new administrative organization of the German Democratic Republic, Suhl became in 1952 the capital of the Bezirk of the same name, with eight Kreise.

(Cf. excursion No 10 described in my Suedthueringen /Southern Thuringia/ (Little Thuringian Forest -- Schleusingen -- Suhl).)

In the Source Region of the Lauter Near Goldlauter

Via autobus from Suhl through the granitic fault pit of Heidersbach via Struth-Froehlicher Mann-Heidersbach to Goldlauter. The granite, which crops out along the entire route, is extensively disintegrated, mellowed, and excoavated into a caldron-like form by numerous trough lines. Often the arkose crops out in so-called gravel pits. To the northwest of both town sections the granite is suddenly cut off on a Hercynian meridional disturbance, the Heidersbach disturbance. On the other side of this disturbance there is an outcropping of hard, resistant Rotliegendes stone, Goldlauter and Oberhof conglomerates, and quartz porphyry of the Oberhof step. Southeast of the Lauter on the Ringberg and Pfannrain there is an extraordinarily viscous outcropping of porphyry of the Gehren step. Behind Goldlauter and Heidersbach rises the Rotliegendes Bergwelt up to the highest massif of the entire mountains -- the Beerberg (982 m) -- and falls extraordinarily steeply, so that it was only possible for the town section of Goldlauter to develop row-like on a narrow street in the deep V-shaped valley of the Lauter. Further, conditions are such that barns must be attached to the houses on the ground floor, and gardens and meadows are connected on steep places with a slope of 45° or more. The fan-shaped source

brooks which flow down the mountains collect in the valley. Duerre Lauter, Pochwerksgrund, Ramselbach, Lanre Lauter, and Pfannthal to the Lauter. The copper and silver mining in the stamp-mill region was the inducement for the establishment of the very young settlement of Goldlauter (1546). Here are located the tunnels on the "Hirschzunge," the "Weisse Lilie," the "Goldene Rose,"; the smelting plants (3 or 4); and 8 stamp mills. The kidney-shaped ore slate of the Acanthodes horizon was mined (the latter was named after a Potliedendes fish -- Acanthodes gracilis). In 1858 Cotta reported that the "Goldene Rose" yielded 2 1/2 pounds of black copper per centner of kidney-shaped ore, that the "Hirschzunge" yielded one pound of black copper per one centner of kidney-shaped ore, and that 27 1/2 centners of kidney-shaped ore was produced from 400 centners of slate. Today Goldlauter is inhabited by workers of nearby Suhl.

In addition, the inhabitants carry on small-scale, poor farming on their stony fields. In general, spruce forests cover the porphyritic stone (beech forests on the Pfannrain). There is considerable soil erosion on the steep slopes. Here, near the mountain crest, there is much precipitation (the Schmucke receives 1,356 mm yearly). Thus, cultivation can be conducted only on a small-field basis. Plowing is impossible; the soil can be loosened for potato cultivation only by means of wooden digging utensils. Manure must be brought up by the people themselves in baskets -- in winter by "manure sleds." The potato represents the principal crop; in addition, small-scale farming of beets, rye, barley, and oats is conducted. However, the cultivation of meadows is significant; it is carried out on the lush and nutritious mountain meadows. Nevertheless, cattle raising has strongly receded (from

about 300 to 73). On the other hand, goat raising has increased tenfold (from 100 to 1,000). The fruit cultivation under the cover of the high mountain walls is quite remarkable. The community has about 3,000 apple and pear trees. In addition, there is large-scale gathering of bilberry, red whortleberry, and raspberry, as well as of medicinal herbs and mushrooms, which are brought to market in the towns.

It was decided to discuss as a protected landscape the valleys which extend to the central group of the mountains and which are distinguished by an abundance of interesting plants (Figure 10).

We submit here a list of the plants which are protected in the three mountain valleys which afford protection of the landscape.

## Duerre Lauter

## Lange Lauter

## Pfann Valley

*Coeloglossum viride*

*Gymnadenis conopsea*

*Orchis latifolia*

*Orchis maculata*

*Orchis mascula*

*Orchis sambucina*

*Lonicera nigra*

*Botrychium Lunaria*

*Circaea alpina*

*Galeopsis speciosa*

*Polygala depressa*

*Gentiana germanica*

*Adoxa moschatellina*

*Corydalis intermedia*

*Hypochaeris maculata*

*Dentaria bulbifera*

*Dentaria bulbifera*

<i>Scorzonera humilis</i>	<i>Lycopodium alpinum</i>	<i>Pulmonaria officinalis</i>
<i>Thesium pyrenaicum</i>	<i>L. anceps</i>	<i>Trifolium montanum</i>
<i>Viola palustris</i>	<i>Polygonatum verticillatum</i>	<i>Viola palustris</i>
	<i>Rosa tomentosa</i>	

The wooded meadow in the valley head of the Duerre Lauter near the Rosenkopf road, which is included in the protected-landscape region (it may not be afforested), represents an uncommonly floriferous *Meum athamanticum* mountain meadow. In addition to the above-mentioned orchises, there are *Leucorchis* (*Gymnadenia*) *albida* and other mountain-meadow flowers. Below the wooded meadow, at the edge of a spruce plantation, we find three types of *Lycopodium*: *L. complanatum* f. *anceps*, *L. clavatum*, *L. alpinum*.

On the lower part of the wooded meadow, on peaty places, we find *Drosera rotundifolia*, *Pedicularis palustris*, the sedge *Carex Oederi*, *Viola palustris*, *Eriophorum latifolium*, *Trientalis europaea*. We attain the Rosenkopf road at an elevation of 801 m, take this road up to the Rosenkopf, descend at the Rollwand, and come upon old mining drifts and heaps. Thus, near the "Hirschzunge" we encounter Rotliegendes petrifacts: *Sphenopteris*, *Pecopteris*, *Calliperis*, *Odontopteris*, *Neuropteris*, *Equisetum*, *Calamarien*, *Annularia*, *Asterophyllites*, as well as *Nacktsamige Cordaiten*, *Walchia*, *Ullmannia Bronni*, et al. Here, we draw the reader's attention to the explanations accompanying the geological map of Suhl, and to the short work of R. Heym which includes a sketch by the author of the interesting petrifacts. In the stamp-mill region the *Polystichum lonchitis* is represented in a sole location and grows under the most scrupulous protection (rediscovered by Alfred Blaufuss).

Now, downward into the Pochwerksgrund, then from the town into the valley of the Lange Lauter, then upward in the Pfann Valley (cf. the lists of flora). Woodruff-beech forests grow on the porphyritic Pfannrain in the variants of *Elymus europaeus*, *Festuca silvatica*, *Lysimachia nemorum*, and *Chrysosplenium alternifolium*. These forests shelter in particular black woodbine, Christopher herb, sweet sultan, the bulbous tooth root, golden nettle, Paris herb, the verticillate Solomon's-seal, lungwort, and numerous clusters of forester fern: *Athyrium filix-femina*, *Dryopteris Phegopteris*, *D. Linnaeana*. Still growing in the valley head on the Dicker Busch below the Mordwiese are *Leucorchis albida*, *Platanthera bifolia*, and *Sedum villosum*.

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#### 15. The Wildlife Reserve Area of the Upper Vesser Valley

The excursion leads through the interesting metamorphic region of granite on the upper Vesser with its informative stone overfault, through the partially still-native beech forest which has abundant silver fir and sycamore, to Vesser, Stutenhaus, Adlersberg, the Crux Mines, and to Schmiedefeld-on-the-Rennweg.

Starting point: Schleusingen or Suhl by rail to St. Kilian (cf. Vol 1, page 82). (Those who undertake the excursion from

Schleusingen should first visit the Franke-Museum of the Bertholdsburg, which the former teacher at the Henneberg Gymnasium, Prof. Dr. Hermann Franke, had made contributions to and arranged in indefatigable research work. The upper-elementary teacher Paul Georgi, ret., who had become quite close to the latter professor, exemplarily developed the museum with his private collection in the Bertholdsburg, making the museum particularly available to the public and to the scientific world. Written by Georgi, and recommended by us, is a winsome guidebook to this museum. This guidebook was published by the author in Schleusingen.)

Our excursion is through the long-file, former forest-hide village of Breitenbach-on-the-Vesser to the forester's district of Sensenhammer where, one kilometer upward, the boundary fault of the mountains crosses the mountain; sm 1 (coarse-grained Bunter sandstone with pebbles) crops out beside fine-grained quartz porphyry (with a few small xenoliths); while further ahead on the Saaleberg the conglomerates of the Goldlauter strata follow. Here there is a vertical throw of about 800 m, about which the mountain block rose up or the piedmont sank. At the road turn-off at the entrance to a small valley, and as far as Glasbachgrund, we cross an area of micaceous porphyrite -- a volcanic stone of the Gehren Rotliegendes step -- which is quite extensive in this part of the Thuringian Forest. In fine-grained bases there are larger xenoliths of lime-soda feldspars, which are recognizable by their twinning lamellae, black mica, and augite. Since this resistant erupted rock is quite crevassed, it is subject to disintegration, and especially to organic disintegration. The roots of the beeches and white firs penetrate into the crevasses, and as a result of the increasing pressure caused by their roots, the hard rock becomes

increasingly loosened and mellowed. Along the way we can observe manifoldly interesting root formations. The result of the disintegration is a mineral-rich (P, Ca, K) detritus which is particularly suitable for the slope varieties of beech and silver fir. Here, and further up the valley, we have the pleasure of seeing the stately white firs which are up to 250 years old. At the foot of the Muehlkorb in the angle formed by the Vesser and Glasbach there is an outcropping of unaltered, grey-green, easily-cleavable Lower Silurian argillaceous slate. At the mouth of the Glasbach there is an outcropping of amphibolite rock. The latter is a dark leek-green to jet-black, uncommonly hard, and viscous rock in which we recognize finger-long amphiboles and lime-soda feldspars with twinning lamellae as mineral constituents. It is called hornblendic stone or amphibolite. We encounter it often along our excursion in picturesque rock formations which trend Varistian-like from southwest to northeast. The four "Hofprediger" [see Note] on the eastern valley slope of the Vesser also belong to these formations. ([Note:] A deforested forest area which still harbored stigmarian roots in the earth, was formerly called the "Stoecker," later to be called the "Hofprediger" after the Berlin court chaplain who had entered politics in the 1880's and 1890's. The name was then assumed by the four amphibolitic rocks.) All around, between these rock ribs of the amphibolite, we see boulders (which originate from a fault trough). These are altered (metamorphosed) Lower Silurian slates -- the so-called horn slate. As we approach the village of Vesser -- right at the first house of the village -- we observe more strongly-altered Lower Silurian slate which is more viscous and solid than the horn slate mentioned. It is thus called micaceous or hornblende rock. In its eastern part, the village of Vesser is situated on granite which



often crops out in disintegrated state as detritus and in the form of pillows. That unaltered Lower Silurian argillaceous slate which we observed once formed the foundation of the Varistian Mountains. The slate had been folded into corrugated mountains, the Alps of Central Germany or the Varistian Mountains. Thereby, from below, igneous lava penetrated into the subterranean cavities and altered the slate upon contact (as brick clay in the burning kiln). The molten magma congealed into granite. The lower Silurian slate in the immediate proximity of the lava metamorphosed into micaceous or hornblende rock, while that slate which lay more distant metamorphosed into horn slate (Figures 11 and 12). The amphibolites, as well, are altered, contact-metamorphosed rocks. Originally they were diabases (very old erupted rock of a basaltic composition) which in igneous state had penetrated into the Lower Silurian slate. We find ourselves in the so-called contact region of the Vesser granite; thus, here, we can distinguish between an inner and outer contact zone. Within the inner zone of the micaceous or hornblende rock, ores also condensed and accumulated. According to Br. von Freyberg, these ores were segregated from the magma itself, i.e., they are not "contact ores." Thus, mining near Vesser was occasionally remunerative. West of the town lies the field of the Marie Mine -- a field which harbors iron pyrites, iron ore, and copper ore. Nearby there are still several gravel pits on the southeast slope of the Helmsberg and on the Kleiner Herrenhuegel. For centuries mining was remunerative on the Crux north of the village of Vesser. The Roter Crux harbored hematite, iron glance, lodestone, calcareous spar, and fluorite; the Gelber Crux harbored lodestone and iron pyrites. The most remunerative was the mining of lodestone on the Schwarzer Crux. It is said that in quite early times near the Vesser of today miners had

prospected and had smelted the ores on a charcoal hearth. An old document of the year 900 testifies that a man named Adelbert turned over his possessions in "Vezerum" [ancient name of Vesser] to the Fulda cloister. An ironworks in Vesser is mentioned in 1406, and presumably this ironworks represented the grounds for the founding of the small settlement of Vesser. The same presumption is valid in the case of the "Neuwerk" ironworks near the neighboring town of Schmiedefeld -- an ironworks which smelted the cupriferous gravels of Vesser. It is also valid in the case of the "new manorial smelting furnace" above Breitenbach (near Sensenhammer) in 1899.

The strongly mineral-impregnated derived soil and the pronounced oceanic beech climate (100 to 120 cm precipitation) have evoked fascinating forest conditions in the upper Vesser Valley; multi-variety beech-silver fir forests with stately red beeches, sycamores, firs or silver firs, spruces, or red firs with witch hazel, daphne, woodbine (*Lonicera nigra*), *Sambucus*, raspberry, and blackberry in the undergrowth, as well as with multi-variety flora in the fields (woodruff, dog's mercury, baneberry, tooth root, spring *Cytisus*, four-leaf Paris herb, lungwort, sweet sultan (*Adoxa moschatellina*), white and yellow anemones, golden nettle, et al).

The animal world is likewise represented in a multitude of varieties: I refer the reader to my biology-landscape study (1937). Now, further along our excursion way through the inner zone of the metamorphic area (hornstone), over the granite and Rotliegendes micaceous porphyrite, to the Stutenhaus. On both sides of the upper Vesser Valley two large clearings were made and utilized as cattle pastures already before 1550 by the counts of Henneberg

and from 1674 to 1852 by the horse breeders of the Vessra cloister. The last attempts at horse breeding were made by the town of Schleusingen in the period 1860-1865. Thus arose the "livestock houses" near Schmiedefeld, the old "mare house" east of the Vesser on the Volkmarshof, the old "stallion house" west of the Vesser which was succeeded by the new "mare house" in 1832 (the mountain inn of today). The names of fields, e.g., Fohlenweide [Foal pasture], Stutenwiese [mare meadow], Hengstwiese [stallion meadow], are reminiscent of the livestock grazing of olden times. After we have enjoyed the glorious view over the Stutenweise of the impressive landscape mountain with its deciduous mixed forests, clearings, and the settlements (Schmiedefeld, Frauenwald, and Neustadt-on-the-Bennweg), and further in the distance, of the Franconian step formation up to the Franconian Alb Mountains near Lichtenfelds, we ascend the Adlersberg (849 m). The mighty hurricane of 1946 and the ensuing bark-beetle plague fully deforested the towering mountain and destroyed the silent spruce forest. The Hennebergische Waelderbeschreibung [Henneberg Descriptions of Forests] of 1587 offers valuable suggestions for the reforestation of a soil-dependent economic forest. At that time the Adlersberg was called Arlesberg because of its stately maples (called "arles" in Old High German); it is mentioned in the treatise on "Beeches, Firs, Maples, and Other Trees." The view from the high tower which rises over the barren area is quite informative: over the beech-rich forest with the above-mentioned clearings, over the old pre-Permian surface of the mountains and its deep channeling through the Schleuse with the forest brooks (Nahe, Vesser, Erle) which invigorate the latter. Here, in the piedmont where the Erle, Vesser, and Nahe flow together, lies the former capital of the princely-endowed county of Henneberg -- Schleusingen. Here, where the witch hazel does not grow, lies Suhl,

the old armorer's smithy, today the capital of the Bezirk of the same name. Over the left bank of the Werra is the Franconian rise, a post-basaltic surface. Thereabove are the twin mountains Dolmar and Geba. Still further distant are the Rhoen Mountains whose basaltic overstep is indicated by the pre-basaltic surface. In the background are the Hass Mountains, the last extensions of the Franconian Alb Mountains near Lichtenfels; and far to the east, the Fichtel Mountains.

Now, back to Vesser, along the Helmsberg where iron pyrites were prospected for in old sinks, and upward into the meadow-rich Vessergrund which in magnificent color illuminates the multi-type harboring mountain meadow around Johanni (cf. the slope types of the Mordflechwiese, page     ), and which is to be included in the wildlife reserve area which itself is to be expanded. We pass through the area and walk along the other slope of the valley where we find ourselves once again in the metamorphic zone which here often appears in the form of composite veins in an apophyse from the micaceous rock. Further on to the Schwarzer Crux, the former main ore deposit of the Vesser region, where, south of the old machine house, one can still find traces of the last minerals -- garnets, fluorite, tourmaline, calcareous spar, and lodestone -- and then up to the highway which comes from Suhl by way of which we reach Schmiedefeld.

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16. An Excursion on the Rennsteig from Hoerschel-on-the-Werra to  
Blankenstein-on-the-Saale

The Rennsteig (R) was placed under landscape protection in the form of broad strips (each 4 m on both sides of R). The purpose of the excursion is to adduce all the remarkable points of R, and to bring forward in summary the great problems of this block, orogenesis, mountain formation, and settlement.

Before we begin our Rennsteig excursion, in accordance with the old custom, near Hoerschel, we observe in the proximity of the railroad station of Hoerschel the manifold disturbances in the undulatory limestone which appear in the form of strong foldings, contorsions, and smaller fault crevices. Here, however, the most remarkable thing is that basalt has upwarped in the form of two veins in such a crevice (Figure 13). Two m above the railroad yard, the vein manifests a conspicuous bend. The uniting member piece once lay before the present wall of the cleft. At the ascent from Hoerschel (200 m) to the Hohes Rod (357 m), we watch closely for the rocks which lie about and crop out here and there, as well as for the bedding of these rocks (Figure 2). We easily recognize the undulant limestone ( $\mu 1$ ), a rock similar to that near the railroad station of Hoerschel; higher up, red clays, lean clays, and yellow Upper Bunter dolomite of the Upper Bunter or Roeth (so). Upon the fields on both sides of R, the coloration of the soil reveals their belonging to the Roeth. To the right in the mountain forest the dip toward the northwest can be recognized from the lean clays, as is the case with the following strata of the Middle Bunter, over whose upper edge we walk. From the first hill in the variegated, loamy sandstone (su) we look into the Werra Valley, toward Neuenhof on the right, toward Wartha on the

bank of the river, and over to the Kielforst with its rock-slide area. After we have gone further, we encounter to the left the Wartburg. The lean clays of the Upper Permian appear near a great pine with the way marker "Clausberg." A calcareous-plant community (*Brachypodium pinnatum* grass with *Koeleria pyramidata*, *Medicago falcata*, and rest harrow (*Ononis repens*) conspicuously reveals the calcareous soil. There where the R extends along a *Melica uniflora*-beech forest with stately old beeches, there is an outcropping of fetid bituminous shale and amygdaloidal Zechstein dolomite which give off foul odor when struck, as well as of frequent Zechstein limestone in the marginal area. A moderately steep escarpment leads in the Zechstein to the Hohes Rod (357 m). Cellular, dolomitic limestones -- the so-called *rauhwacke* or crystallized dolomite (zo) -- can be seen here. The mountain forest is almost exclusively a beech forest with a vegetation now rich in grass (*Melica uniflora*), now rich in woodruff anemone. It harbors trees in striking abundance and a rich bird life (forest humming birds, "Fitis," "Weidenlaubsänger," whitethroats, *Sylvia*, et al). There where the R extends along the slope of the Tirschplatte, a small block of Rotliegendes rock is exposed in the Hohlweg. This block proves to be the uppermost member of the Rotliegendes, the so-called boundary conglomeration of the Tambach strata. This conglomeration contains rock fragments of granite, quartzite, gneiss, and micaceous schist. In a small cave of the R one can detect the next-youngest stratum: the Zechstein conglomerate (zu); then platy Middle Zechstein limestone which is exposed in a quarry located to the left of the R; and dolomitic, finely-cellular, holey limestone with a dog's-mercury-rich beech forest. On the forest crest opposite the Rangenhof the Middle Zechstein limestone ends and the

lean clays of the Upper Zechstein begin. Obtruding upon them are the escarpment-forming limestone and dolomite of the Upper Zechstein in the Lerchenkuppe (394 m). Once again the R extends along the slope of the Kuhlenkopf through the upper lean clays and the limestone of the Middle Zechstein. We now enter the field of the Clausberg estate and enjoy a charming view of the Werra Valley and the northern Kuppenrhen. Previously, the excursion was quite diversified. Forest, field, and meadow followed in variegated succession. Before the Clausberg estate, we once again see the cellular, aphrite-like Middle Zechstein limestone with a cover of warmth-adapted plants (*Epipactis atrorubens*, *Fragaria viridis*, *Silene mutans*, et al.). Very fine is then the transition from Zechstein into the Rotliegendes, represented by Zechstein limestone (zm), Zechstein conglomerate (zm), Zechstein conglomerate (zu), Grauliegendes conglomerate (ro 5), and red-brown clay shale (σ4). Near the Clausberg estate two old trade roads link: (1) the road through the "Kurze Hessen" (Hersfeld, Berka, Foertha, the Huetschhof estate south of Clausberg); (2) the road over Vacha, Marksuhl.

Both ways lead down from Clausberg to Eisenach. There where the road branches off from the R to Huetschhof and Oberellen, we follow a footpath which soon leads to a basalt-ballasted road. We follow this road through the densely-wooded Bunter-sandstone landscape (su 2), past the ancient owl-oak, the abode and nesting place of many cave-brooders (including the screech owl after which it was named), to the Stopfelskuppe. This latter represents a basaltic cone whose 431-m-high peak towers high over the forest "sea" of the Bunter sandstone. In two stone quarries both basaltic dikes were mined, whereas the tuffaceous cover still remains to an

extent. The dark brown tuff is a mixture of looser tuff (volcanic ash) and numerous black, mostly round basaltic fragmental products (so-called lapilli) and rust-yellow ferruginous Bunter sandstone fragments. A genuine pipe filling, which can take the place of tuff, is developed in one part of the quarry. It contains cemented, angular fragments of the intruded rock, smaller and large volcanic bombs, ash, and sand. The remains of the Bunter sandstone, which was baked by the intense heat, are still to be found in the southern fault break. We return by the same way to K, and the way now leads through platy dolomite (zo 2) and calls forth in this region on the edge of the forest in the southwest a stretch of steppe-heath with a community of warmth-adapted plants in the middle of the beech region and the oceanic beech climate: a field of *Brachypodium pinnatum* with *Anemone silvestris*, *Fragaria viridis*, *Helianthemum chamaecistus*, *Hieracium pilosella*, *Hippocrepis comosa*, *Linum catharticum*, *Lotus corniculatus*, *Ophrys muscifera*, *Plantago media*; *Potentilla verna*, as well as animal-like limestone formations (maiden pink = *Zygana*).

Before the K is crossed by the street which leads up from Salzungen and Marksuhl and down into the Georgen Valley, Zechstein conglomerate (zu), Grauliegendes (ro 5), and particularly red-brown clay shale (s 4) are well exposed. Standing above the Werra tunnel, we enjoy a magnificent view of the Georgenthal. Then we descend into the opposite forest valley in which the Werra Valley rail line extends further. This valley affords an extremely beautiful view of the bedding and the rock characteristics of the Main Conglomerate (ro 4) which consists of debris of porphyry, gneiss, granite, quartzite, micaceous schist. The hanging beds form the above-mentioned boundary clay shale (s 4) which crops out



on the way down into the valley. Above all, however, we should direct our attention to an excellent exposure of the geology of the region near the railroad station of Foertha (Figure 15). The sequence of formations can be seen in the profile below. Above the bright red, clayey conglomerates of the Tambach strata lies a grey conglomerate -- the so-called Grauliegendes -- with small nodules of green malachite. The Zechstein Sea decolorized the Tambach conglomerates down to this depth. In the Zechstein conglomerate above the Grauliegendes, malachite, azure copper ore, and cobalt bloom reveal that the conglomerate was once ore-bearing, as was the 1/2-m-thick copper-slate stratum which consists of a black, bituminous, marly slate. Both strata were previously mined. On the nearby heap remains the impressions of fishes (Palaeoniscus), as well as branches of Voltzia and Ullmannia, can still be collected. We now return to R which extends to the Wilde Sau, and further in the Main Conglomerate (ro 4), to the crest of the mountains. On both sides we see valleys which begin trough-shaped and then narrow into deep V-shapes. One finds here an impressive representation of the struggle for the watershed which contributes in favor of the southwest side which has heavy precipitation. Thus, it happens that the R rises and falls in zigzag course (Figure 16). We now descend to the valley of the Knoepfelsteiche. The Main Conglomerate disrupts in a striking escarpment into a merely small terrace. Red-brown, little-resistant clay shale (G3) forms the soole, and to an extent the roof, of the ro 3 terrace. It likewise disrupts into a step; and clay shale (G2), in which the Knoepfelsteiche lies, again forms the soole and roof of a still older conglomerate -- the Wartburg conglomerate (ro 2) -- in which the brook has intruded canyon-like. However, before we come to the still more grandiose canyon, the Drachenschlucht, and ascend

to the Hohe Sonne, we should pay a short visit to the Wartburg  
 [see Note], this jewel of Germany.

[Note:] The municipal settlement of Eisenach. Tour of the town. From the railroad station, through the Nikolaitor [Nikolai Gate], past the Nikolai Church, a triple-winged basilica which was originally a cloistral settlement (1172-90), to the Karlsplatz which harbors the Luther monument of Donndorf (the side reliefs represent the relationship of Luther to the Wartburgstadt), down the Karlsstrasse to the market place with the Weimar Castle which has become the Thuringian Museum. Here there is also the St. Georg Church with the gilded statue of St. Georg. Through the Johann Sebastian Bach-Strasse to the Frauenplan with the monument of the great composer and the Bachhaus in which Johann Sebastian Bach was born on 21 March 1685. Since 1906 it has been a museum, a visit to which is highly recommended. It exhibits the middle-class milieu of the latter seventeenth century, contemporary furniture, engravings, and pictures, as well as a valuable collection of musical instruments. On the eastern side of the town there are magnificent parks, the Karthausgarten, and the town park on the Pflugenberg with old oaks, beeches, and woodruffs. The Thuringian regional consistory has its seat here. Ascending higher, we come to the Burschenschaft monument which is dedicated to the struggle for German unity. On the three-hundredth anniversary of the day on which Luther announced the liberation from the serfdom of the Middle Ages by means of his theses, 467 students of German universities had assembled on 18 October 1817 on the Wartburg to proclaim the reaction to the struggle. From the Burschenschaft monument we view the conditions of the town which developed at the foot of the Wartburg, thanks to a favorable

location with respect to transportation, into a landgravia -- later a Wettin -- capital town and into a trade center of considerable importance. Before the pass between the mountains and the steep-walled Hoerselberg there is a junction of important trade routes from Frankfurt and the Netherlands. United into one, on the other side of the pass this route extends through Thuringia, via Gotha and Erfurt, to Leipzig. Eisenach once disposed of a lively trade with the products of its grape and hops growing, as well as of its industries of the Middle Ages, weaving and cutlery. In the nineteenth century a many-sided industry blossomed in extensive dependence on one of the main arteries of the modern transport-line network (machines, motor vehicles, metal products, heat installations, electrotechnical products, chemicals, wool combing, worsted-yarn spinning). There where the industrial region broadens in the valley-like depression of the Hoersel there is the juncture of the villa quarter of the town of the people of independent means to the woods-encircled piedmont. The youngest quarter is in the "Creuzberg trench zone" on the slopes of the Wartenberg and the Landgrafenberg (population: 50,000).

We follow the marker "Saengerwiese-Wartburg" through the intermediate clay shale (G 2), and through the Wartburg conglomerate (ro 2), to the Wartburg. Built about 1075-1080 by the landgrave Ludwig der Springer, it was first a strong fortress in control of old highways and trade roads, a bulwark incapable of being taken and representing landgravia might against imperial -- a bulwark which was capable of a victorious attack against the imperial army. In the period 1180-1220 there arose the landgravia house, a palace (the Palatinate (Pfalz)) which is a quite

special jewel of the highest artistic power. Thereafter the Wartburg was no longer a fortress but rather a Thuringian landgraviat house where the landgravess Elisabeth (1221-1231), the most estimable woman of the German Middle Ages, who anteceded the Christianity of her time in works of charity and in asceticism. The Wartburg was the university of the early Middle Ages. Under the reign of Hermann I (1190-1216), the great singers (Heinrich von Ofterdingen, Heinrich von Veldeke, Wolfram von Eschenbach, Walter von der Vogelweide, Reimar von Zweter) found the atmosphere and inspiration for their immortal poetical works in the refined court life of this "German Gralsburg" in the "green heart of Germany." The hall of singers and the hall of festivities of the Wartburg are dedicated to the memory of these glorious times. A wall painting of Mortiz von Schwind glorifies the fabulous competition of the singers. The much-admired wall painting of von Schwind in the Elisabethan gallery represents the life of the holy Elisabeth. The necessary restoration work on the landgraviat house was carefully carried out by Dr. Siegfried Asche [see Note] who saw to it that proper protection was afforded all the artistic jewels of this unique secular building. ([Note:] Asche, Siegfried, Die Wartburg und ihre Kunstwerke [The Wartburg and Its Works of Art], 1954, Eisenach.) The singer's hall, the landgraviat house, and the chapel are again open to the public. In the rooms near the entrance to the castle the visitor is shown the plain room of Luther in which the great reformer lived as "Junker Joerg" in the period 1521-22 and completed for his people the greatest philological accomplishment with his translation of the Bible. Finally, we should visit the tower of the castle with its extensive view. Before us lies the town of Eisenach at the

margin of the Waldgebirge and in the valley of the Hoersel before the "Hoerselpass" between the mountains and the steep-walled Hoerselberg. Here, important trade roads of the Middle Ages ran together, and, thus linked, on the other side of the pass led to Leipzig through Thuringia via Gotha and Erfurt. To the south, the Waldgebirge appear before us like an amphitheater. It is charmingly divided by deep forest valleys. Geologically and morphologically, the Marien Valley and its three upper ramifications, the Drachenschlucht, the Landgrafenschlucht, and the valley of the Knoepelsteiche, are worthy of inspection. To the southeast the porphyry group of the Inselsberg (916 m) towers as the highest point of the northwestern Thuringian Forest. To the east we see the Drei Gleiche and the Ettersberg near Weimar; to the south and southwest, the Rhoe Mountains with their characteristic mountain formations, Hohe Geba near Meiningen, Salzunger Pless, Oechslen, and Dietrich near Vacha, Bayer near Dermbach -- all deciduous-wooded, basaltic, residual overthrust mountains. In the west the Hoher Meissner appears blue in the distance; this mountains is the landscape-prevailing, residual overthrust mountain of the Hessian mountainous country. And once again we view the German castle from which the Wartburg cry of 1817 resounded in all the regions of Germany: "There is a Germany, so shall it be and remain !" Now, we again descend to the Drachenschlucht which represents a truly classic example of the erosional power of water. The Rotliegendes rock was permeated with innumerable clefts in all directions in early geologic times as a result of lateral pressure. Rainwaters infiltrated into the clefts and slowly destroyed the hard conglomerate. The clefts widened. Several clefts trending in the same direction were located near each other, so that it was possible for deep indentions, corrosion troughs, to occur. The flowing water

followed them, deepening and widening them as far as the trench-like gorge. Thus arose the Drachenschlucht. Rock-face walls up to 10 m high stand closely opposite each other, and even further up do not separate at all or only to small extent. A path with a beautiful course leads now on this side of the foaming water, now on the other side. The brook seems to play a muffled, yet rousing, melody at our feet. The water runs down continually from the moss-covered rock faces. The plants of the moss-covered, fern-embellished, damp rock faces, as well as the wintery frosts, abet the destructive activity of the flowing water. Roots widen the larger and microscopic cracks of the stone; the bursting force of the frost continually loosens the surface of the rock masses; and the trickling water carries off the loosened particles to the floor of the gorge where these particles enhance the "prospecting" of the flowing water. On the walls we see several rows of large kettle holes which attest to the earlier rock-forming power of the brook. The Drachenschlucht represents a form of past ages, the formation of which occurred in the period of stronger water content. In the cool, damp, crevassed rock a special vegetal community has taken root: the ravine forest (composed of beech, elm, woodruff, oak) with assemblages of touch-me-not (*Impatiens noli tangere*), ramson (*Allium ursinum*); with stands of *Chrysosplenium alternifolium* and *oppositifolium*; with a number of mountain shrubs: *Centaurea montana*, *Phyteuma spicatum*, *Prenanthes purpurea*, *Senecio Fuchsii*, as well as covers of foliaceous moss and liverwort which cover the damp, cool, and shady conglomerate walls of the canyon-like gorge. Growing in the moss covers are small ferns (fragile bladderwort, "Buchenfarn," and angelica) and delicate moisture- and shade-adapted plants (*Chrysosplenium*

alternifolium and oppositifolium, wood sorrel, et al). From the "workshop" of erosion we ascend to the Hohe Sonne, the old halting place on the R, which the Weinstrasse or Fuldaische Strasse follows for a short stretch, and which in turn leads through conglomerates of the upper Rotliegendes (ro 2). On the Toter Mann (528 m) there is an outcropping of quartzite-rich, overthrust porphyry. We now find ourselves in the region of the Ruhl saddle, an upfolding of the Carboniferous or Variscian mountains. The oldest rock of the region -- the micaceous schist belonging to the pre-Cambrian, was folded here. Still during the period of the upfolding, granitic magma penetrated into the subterranean cavity of this great fold, congealing into the main granite or gneiss when the folding resulted in parallel bedding of the mineral constituents (gneiss structure). Ascending to the Ruhla hut, we walk over micaceous schist, a shining, silver-grey metallic-like, slaty mantle rock which consists of a mixture of quartzite and mica, as well as over thaler gneiss. Ascending to the "Auerhahn," the hunter's hut, we observe once again the oldest rock of the region -- the micaceous schist. The R then leads through a granite landscape which has been extensively disintegrated and eroded. If one considers that the main granite congealed in the Paleozoic era as abyssal magma into a thick micaceous-schist shell which extended domelike, one can visualize the extent of the degradation of the Paleozoic corrugated mountains. A little downward to the side of the R lies the quarry on the Birkenheide. The here-exposed micaceous schist is permeated by two granitic apophyses (veins) which attest the younger age of the granite in contrast to the ancient micaceous schist. The micaceous schist was also contact-metamorphosed by the once glowing-hot granitic magma, i.e., it has been altered into hard viscous rock through contact with the magma. The stone quarry

thus lies in the metamorphic area of the granite. Two impressive block peaks rise above the granitic landscape: Glocckner (691 m) and Gerberstein (720 m) (Figure 17). The main granite forms coarse-grained stone which the large, flesh-red, shining feldspar (orthoclase) lends an almost porphyritic appearance. In addition, whitish lime-soda feldspar (plagioclase), quartzite, and black mica are clearly recognizable. The eruptive stock of the granite of the Glocckner, permeated by innumerable cooling (jointing) clefts, was disintegrated by agents of the atmosphere into many blocks which are piled over each other and which lie about profusely. The mountain waters washed off the atmospheric waste, the arkose, into the valley (Figure 17).

The R leads to the Glasbach meadow, crosses the Ruhla road, and then ascends gradually to a second, still-thicker granitic-block peak -- the Gerberstein (720 m) -- which is surrounded by a pleasant ring of beeches. After a long walk through the forest, we enjoy an open view of the glorious mountain-beech forest which thrives splendidly on the mineral-rich forest soil which is covered with glistening mica flakes. The dome-shaped micaceous-schist mountains between Ruhla and Schweina (Bermer, Breitenberg, Vogelheide, Birkenheide, Windsberg or Wodansberg) and the basaltic, residual overthrust mountains of the knobby Rhoe prevail over the horizon. A particularly impressive picture is formed when the knobs of the Rhoe project like needle-sharp islands from the floating sea of fog of the southwestern piedmont. Near the Dreiherrnstein mountain inn there is another outcropping of primeval micaceous schist; on the Huehner meadow there is an outcropping of a small block of Rotliegendes conglomerate, sandstone, and clay of the Goldlauter strata. Even here the deep bed rock is again formed



by granitic rock which, however, in contrast to the main granite of the Glocckner and Geberstein which we have already observed, has assumed a gneiss structure. This so-called Brotterode gneiss represents a mica-rich granitization which has assumed a parallel pattern due to the orogenic folding. Later, porphyry dikes penetrated it and superimposed themselves in the form of a cover as on the Grosser Beerberg, the Venetianerstein, and the Grosser Inselsberg. This "Beerberg porphyry" is characterized by large feldspar xenoliths. The towering porphyritic rocks of the Beerberg, 800 m high on the Rennsteig between the Dreiherrnstein and the Grosser Inselsberg, form the basset of a vein in the gneissic granite which rose up as igneous lava in the Rotliegendes era. Since it is much more resistant than the more easily weathering granite, it prevails over the landscape in picturesque rocks. At the base of one rock there is a weathered-out cave about which sagas have been woven. The beautiful sycamore stand in its proximity is afforded natural protection. However, the beeches which are beset by storm, snow pressure, and harsh frost suffer damage, thus remaining stunted, growing thicker rather than taller. The branches are often bent and serpentinely twisted, as is often the case at this elevation, as well as in the environs of the Reitsteine between Grosser and Kleiner Inselsberg. From the Beerberg we enjoy a magnificent view of the Brotterode (caldron) in the gneissic granite (Brotterode gneiss), the Seimberg (pre-Cambrian micaceous schist) towering in the background, the valley constriction of the Trusen Valley, and the Rhoeen Mountains in the distance. The mountain, which projects chandalierlike over the mountain crest, represents a quartz-porphyrific, residual overthrust type from the Rotliegendes era (Oberhof phase, overlying the Brotterode gneiss in the south and the Rotliegendes sediments

of the Goldlauter phase in the north (Figure 18). One can enjoy an extensive panorama from the tower of the woodless summit area. We now view the densely-wooded mountains which grow smaller to the northwest in the direction of the Wartburg and which broaden more and more levelly to the southeast. Of the noteworthy points of the mountains, the following bear mentioning: the granitic block peaks of the Glockner and Geberstein; the knobs (pre-Cambrian micaceous schist) of the Windsberg, the Arnsberg, and the mountains around Ruhla; the residual porphyritic knobs of the Grosser Hermannsberg, the Adlersberg, the Schneekopf, and the Kickelhahn; behind the latter, the Langer Berg of the Slate Mountains. In the Thuringian basin: the Hoersel Mountains and the mountains of the Gotha-Arnstadt-Saalfeld disturbance zone (Krahnberg, Seeberg, Drei Gleichen); between the anticlinal uplifts of the Fahner heights, the Steiger Mountains, and the Etter Mountains, the natural municipal heart of Thuringia--Erfurt -- with the double trident-tower of St. Marien and St. Severi; behind the latter, the Sachsenburg on the Finnestoerung; behind the latter, the uplift zone of the Kyffhaeuser; on the edge of the horizon the Hercynian heaved block of the Harz Mountains with the Brocken and the Auersberg. In the southern or Franconian piedmont the view sweeps over the valley of the Werra, which is flanked by striking basaltic residual overthrust mountains of the pre-Rhoen facies; Geba and Dolmar, Stoffelskuppe and Pless, Oechsen and Dietrich (Figure 18). Behind rise the towering basaltic overthrust mountains of the Rhoen: Kreuzberg, Dammersfeld, Wasserkuppe, Milseburg. Extending to the southeast is the Grabfeld trough with its landmark, the twin, towering, basaltic, residual knobs of the Gleichberge. Appearing blue in the distance are the Wilhelmshoehe and the basaltic, residual overthrust mountain, the

Hoher Meissner. We should like to call to the attention of all visitors to the Inselsberg the Inselsberg Museum which is established in the Hotel Gotha. This museum has documents, surveying records, a geologic map and a geologic profile, pictures, and a panorama by the famous Gotha geographer Justus von Plaenhner (1791-1858). We point out that a pamphlet, Inselsbergschau des Heimatmuseum Gotha [Inselsberg Exhibition of the Gotha Regional Museum], is available at the hotel.

Ascending to the Rennsteig from the Grosser Inselsberg, but not taking the usual way, we go down to the bordering meadow on the Kleiner Inselsberg to pass the porphyritic Reitsteine at an elevation 850 m. Here we attain towering rocks with an extension of residual boulders. The dwarf pines planted in the 1880's have strongly influenced the impression of this once grandiose rocky landscape.

The mountain forest of the Inselsberg is characterized by the following flora: *Adoxa moschatellina*, *Aconitum lycoctonum* and *A. variegatum*, *Aquilegia vulgaris*, *Centaurea montana*, *Digitalis purpurea*, *Pirola media* and *P. rotundifolia*, *Galeopsis speciosa*, *Lilium Martagon*, *Mulgedium alpinum*, *Polygonatum verticillatum*, *Ranunculus aconitifolius*. The mountain meadows harbor *Arnica montana*, *Gymnadenia albida*, *Platanthera viridis*, *Hypericum quadrangulum*, *Fibes alpinum*, *Rubus saxatilis*, *Rosa glauca*.

Descending to the Kleiner Inselsberg, we walk over Brotte-rode gneiss. On the Trockenberg (807 m) we tread main granite, which is superimposed by a porphyritic cover in the Grosser Jagdberg (814 m). At the Kleiner Jagdberg we enter the Rotliegende (Oberhof) trough (Figure 19). The latter is filled with conglomerates: sandstone, clay shale of the Goldlauter and Oberhof

phases, as well as mighty lava flows and tuffs of the Oberhof era. Goldlauter conglomerates crop out on the Kleiner Jagdberg. We now attain the forest inn on the Heuberg. In the trench of the forest road which follows the R there is an outcropping of red sandstone and clay shale (rm 2). Quarzitic porphyry of the Heuberg from the Oberhof phase lies about in fragments. There where the R branches off from the forest road, we walk over the upper edge of the red sandstone (rm 2) which plunges toward the southeast. We now find ourselves in the Oberhof basin. Ascending higher, Oberhof quartzitic porphyry once again lies about in specimens shortly before the bend of the R. We follow the R in a southeast direction, passing a small bed of basaltlike, dark melaphyre of the Oberhof era. Way markers guide us further.

Spruces are planted at this elevation, but beeches still follow the old mountain path which has the appearance of an avenue of beeches. Rock fragments of Oberhof quartz porphyry again indicate a volcanic cover. Some of these fragments contain beautiful lithophyses -- cavities filled with rock crystals. Unfortunately, the view toward Finsterbergen is somewhat obstructed by overgrowth. We now attain the Spiessberg (749 m), which is entirely constructed of basaltlike Huehnberg rock or mesodiabase. Glowing lava congealed subterraneanly in the middle Rotliegenden (Oberhof) on a 10-km-long crevice rather than in the form of cover on the surface of that time, as in the case of porphyry. Blocks of this hard and very resistant stone lie about between dense beech woods and stands of *Galium herzycicum* (saxatile). In descending over the brownish-red, loamy residual soil of the mesodiabase, we enjoy a beautiful view of the valley of the Kaltes Wasser which leads down to Kleinschmalkalden. By striking the

fragments of the Huehnberg stone which lie about, we recognize the principal constituent, plagioclase (lime-soda feldspar). Along the way we see strips of *Festuca ovina* and *Nardus stricta* from which countless white blossoms of *Galium herzynicum* (saxatile) shine forth. Near the "Am Kreuz" hut there are very old beeches with strange shapes -- "beech quadruplets." In the angle between R and the road to Finsterbergen there is an outcropping of sandstone of the rm-2 level (changed by the mesodibasic lava into black hornblende rock). At the lower Pirschhauskopf we again observe mesodibase and on the way to the central Pirschhaus (with a beautiful view of Grosser Inselsberg) we observe unaltered Oberhof sandstone (rm 2), mesodibase, and sandstone which has been converted into hornblende rock. By carefully observing and striking the stone, it is not difficult to recognize its type. Here, the beech forest contains facies of *Poa Chaixii* (sudetica) with *Prenanthes purpurea*, *Polygonatum verticillatum*, *Senecio Fuchsii*, and *Luzula albida*. However, as soon as the spruce appears in stands, the bilberry, intermixed with countless white blossoms of the "Siebenstern," forms the soil cover of the mountain forest. We have attained the Ebert meadow, which in June is decorated with blossoms, in the saddle and vicinity of the central Huehnberg. Within the latter lies the source of the Spitter (Goldborn). We follow its upper course up to the Spitterfall which is caused by a 20-m-high valley step on the boundary between Huehnbergstein and the Oberhof strata. Multi-variety gorge woods cover the hard, crevassed rock, over which the brook flows down, and grow along the mountain brook: beech, sycamore, elm, and silver fir in magnificent stands; *Lonicera nigra* and the richest community of plants which thrive in moist conditions (*Impatiens noli tangere*,

*Chrysosplenium alternifolium* and *oppositifolium*, *Chaerophyllum hirsutum*, *Cardamine hirsuta*, *Cardamine bulbifera*, *Melica uniflora*, *Equisetum silvaticum*); numerous ferns, et al. Cemented to the argillite, vitric tuff forms the hanging bed of the Huehnberg stone on the eastern corner of the Ebert meadow. Then follows Oberhof sandstone (rm 2), over whose projecting upper edge we walk. It is covered by quartz porphyry on the Glasberg. There is an outcropping of fragments of this rock and its gritty, gravelly residual earth on the R. We now go down to the Alte Ausspanne in rm 2, where the road coming from Tambach leads into the valley of the Nessel Brook. The R crosses through the porphyritic tuff of the Rosengarten. This tuff is broken up principally in a quarry before the Neue Ausspanne (the Schmalkalden -- Tambach-Dietharz crossing). The red stratified tuff was used as quarry stone, curbstone and stone steps, due to its easy workability. Here we have a beautiful view of the Huehnberge. From the barren spot of the Kraemer clearing we enjoy a glorious view of the windblown landscape of the Tambach Basin. The basin-shaped stone bed is illustrated in Figure 19. The extensively-excavated Rotliegendes sedimentary rock is surrounded on all sides by harder volcanic stone. We now cross a mountain meadow which lies in the saddle on Oberhof sandstone (rm 2) and which in summer is decoratively covered with blossoms, and ascend to the Sperrhuegel over a small bed of basaltlike melaphyre which lies about in specimens, then to the Schmalkald Leube. Its reddish-brown porphyritic conglomerate (ro 1) of the Tambach level covers the Oberhof sandstone (rm 2). Occasionally there is still snow remaining on the heights of the Leube in summer, as was the case in late June 1941. The rm-2 sandstone is broken up in a quarry left of the R on the other slope of the Leube. The old Meinboldes

road once used the 850-m-high saddle (extension), upon which the road from Steinbach-Mallenberg to Tambach-Dietharz courses today. Meinboldes road then ran on the Rennsteig over a cover of more recent Oberhof quartz porphyry, from where one's eye is attracted by two striking porphyritic residual knobs (Grosser Hermannsberg and the Kuppberg), and then to the saddle of the Wachsenrasen which the road from Oberschoenau to Tambach-Dier Tambach-Dietharz crosses. The porphyritic tuff and the more recent Oberhof quartz porphyry of the Schorn are well exposed on the recently broadened Rennsteig road. Here, one should be on the alert for two beautiful lyre-shaped spruce trees which hem the R. We are in the area of the mighty Oberhof porphyritic eruption. Quartz-porphyry covers from the heights of Schorn (850 m), where the Meinboldes road turned off into Thuringia, as well as the 893-m-high Donnershauck. To the south, on the other side of a small V-shaped valley, we see the Hohe Moest (887 m) with the two Moest rocks. Back to the R, we follow the way which directs us to the Hohe Moest (887 m). Moess, or Mossberg, means Asenberg (Goetterberg) /Ases Mountain (Mountain of the Gods), according to Simrock the tomb of Wodan, the wild hunter, is located in the Mossberg.) These are two mighty lichen- and moss-covered (*Lecidea geographica*, *Andrea petrophilia*) bosses constructed of Oberhof quartz porphyry which project over the forest, affording a glorious view.

At the base lies the V-shaped valley of Kuehn Brook which links with the "Kanzlers Grund," the Hasel valley-like depression. The double-line row village of Oberschoenau lies in the bifurcated V-shaped valley. From the Moest one has a view of the basaltic overthrust residual mountains of the Kuppenrhen (from left to right): Oechsen (truncated cone), Dietrich, Pless, and Stoffelskuppe;

interfingering behind the latter two, Bayer, Horn near Rossdorf, Hahnberg, Geba; to the right in the background of the latter, Leichelberg; left of the Geba, Hutsberg and Neuberg; and further, the characteristic landmarks of the Franconian piedmont of the mountains, the two Gleichberge near Roemhild. The densely-wooded heights north of the "Moeststeine" is the Donnerschauck [see Note below], a volcano of the Oberhof Rotliegendes period (693.5 m); in the background is Grosse Inselsberg with porphyritic overthrust residual remnants; to the left is the Grosser Hermannsberg, which is pointed out as a porphyritic blister or as a "neck cone" which was carved out only recently from the enveloping accumulations of the Goldlauter beds. From the lower rocks we look over to the Ruppberg near Mehliß and to the Gebrannter Stein; between the latter in the background we notice the tower-crowned Adlersberg. From the R, we follow the Tambaoh road past the mountain oavities, where people once prospected for iron, to the upland-moor"lake" between Saukopf and Alteberg on the one side, and Kleiner Muenzeberg and Greifenberg on the other. The upland moor, which is afforded natural protection at an altitude of 820 to 830 m, harbors a bog-moss-rich heather community in which there is a series of natural upland-moor plants, e.g., *Empetrum nigrum*, *Vaccinium oxycoccus*, *Vaccinium myrtillus*, *Vaccinium uliginosum*, *Eriophorum vaginatum*, *Carex pauciflora*, *Drosera rotundifolia*. In some parts of the upland moor there are a few stands of *Scheuchzeria palustris*. However, due to run-off, the bog-moss-rich heather moor harbors a plant community which is obsolescent. The bog moss is disappearing to an ever-greater extent, and another botanical community is coming into existence, viz., a spruce woods with dwarfish shrubbery. It is to be hoped that the upland moor will become regenerated by the filling-up of the fault troughs.



(Note: Donnerschauck is the old German place of execution, festival and cult center. Here a millstone discovery was made by Crawinkler.)

The upland moor on the Schuetzenberg on the Zella Leube (750 m), northeast of the Veilchenbrunnen, is also included in the protected-landscape region of the R, not only because of its rare upland-moor plants, but also because of its importance for the water provision of the densely-populated settlement in this region (Zella-Mehlis). From Rondel (826 m), we visit the nearby Oberhof, the world-famous watering place which is surrounded by a spruce forest. On an old trade road (the forest or Leuben road) there was once a lonely wayfarers' inn -- the "Oberer Mor." A settlement which virtually consists only of inns and transient hotels developed from this old inn. These inns and hotels accommodate 18,000 watering-place guests annually. We now slowly ascend over mighty quartzite-porphry cover to the "Grosser Beerberg" (982 m). The forest today is composed exclusively of spruces among which now bilberry, now Haller reed grass with shrubbery of numerous forest ferns and the ancient lycopods (*Lycopodium clavatum*, *annotinum*, selago, and, sporadically, *alpinum*), predominate in the underbrush. Here, the words of the poet V. von Scheffel, dedicated to the R, are quite appropriate: "Old paths, often covered completely with fern overgrowths, run over mountain summits." We follow for a while the old forest or Leuben road. The panorama offered by Plaenckner's View (named in honor of Major Justus of Plaenckner-Gotha, man of merit for his work on the topography of the Thuringian Forest) on the Grosser Beerberg is not only extensive but geologically informative as well. Before us lies a great excavated landscape -- the Zella-Suhl-Heidersbach granitic fault pit, which

This moor's floral composition is similar to that of the upland moor of the Teufelskreise, which we shall visit on the way to the Schneekopf. About 750 m distant from the turn-off of the Schneekopf way from the Oberhof-Schmucke highway, a path leads off to the side to the two upland moors of the Teufelskreise. These moors harbor bog moss and heather, and typical undershrubs prevail: *Calluna vulgaris*, *Empetrum nigrum*, *Vaccinium oxycoccus*, *V. myrtillus*, *V. uliginosum*, *V. vitis idaea*, *Andromeda polifolia*, *Eriophorum vaginatum*, *Carex pauciflora*. The spread-out types are considered Pleistocene relics. According to Luise Gerbing, digging under the surface of the moor in the 1850's unearthed oak trunks, acorns, and hazelnuts. Found on the lake of the Saukopf were remains of mountain ashes and birches, as well as a "number of seeds which permit assuming that there were once stands of beeches and lindens." R. Jahn, who conducted a pollen analysis of the upland moors of the Thuringian Forest in 1930, i.e., in accordance with the findings of forest-tree pollen which was preserved by peat acids, not only confirmed the afore-mentioned finds, but also established in detail the following forest succession.

The pollen spectrum of the lowermost moor stratum permits the assumption of a hazel-oak-spruce mixed-forest period and a climate essentially warmer than that of today. This and the following spruce-hazel period coincided with the more recent Stone Age. The ensuing cooler and damper beech phase embraced the Bronze Age, the Iron Age, and the historical period. The uppermost pollen spectrum manifests an increment of spruces. However, the transition from the beech period into the present period can be traced not to a change in climate, but to those afforestation processes which favored the afforestation of spruce

on the basis of economic considerations. Historical sources also affirm that there was a multi-variety mixed forest in these upland regions in the Cenozoic era. The Hennebergische Waelderbeschreibung /Description of the Forests of the Henneberge/ of 1587 gives the following forest picture in relation to the Rudelsberg near Schmiedefeld: "This mountain still has stands of spruce, white fir, and young beeches." Similarly, the mountain forest west of the upper Vesser Valley up to the Adlersberg (849 m) is described as a mixed forest. In those early days the Adlersberg was still called the Arlesberg, due to its being covered with magnificent sycamore maples -- Arlesbaum being the Old High German name for the latter type tree. The Waelderbeschreibung mentions, in reference to the Adlersberg, stands of "beeches, firs, maples, and other trees." Spruces are also mentioned as occurring in "other places." In the Thuringian Forest the spruce is a natural species and forms stands only in the damp and moory locations at altitudes over 850 m. Informative above all geomorphologically is the panorama from the highest point of the Thuringian Forest -- the Schneekopf (977 m) (exactly 1,000 m with the tower). Here at this elevation the mountains have a broad, flat development. Numerous valleys originate in the mountains, dividing up the mountains into many transverse ridges or interstream plateaus which in turn are worn-down and which form a crest line in the proximity of the margin of the mountains. These interstream plateaus at first sink but little, to a greater extent only on the margin of the mountains. Thus, one pictures a peneplain above the main ridge and transverse ridge. A broad plateau has also remained in the environs of Oberhof. This peneplain lies at an altitude of an average of 750 m, increasing to 900 m and more in the Schneekopf-Beerberg massif. It apparently originated from a post-Pliocene upwarping of this central part of the mountains.

Panorama: to the northwest, the porphyritic Inselsberg, the Huehnberge, then again two volcanoes from the Rotliegendes era (Donnershauck and Grosser Hermannsberg); to the south, the Slate Mountains, the Eisfeld Bless, the plateau settlement of Steinheid, the old "Goldberg town" on the Kieferle, "Unserer lieben Frauen Berg", the Masserberg mountain health resort, Neustadt-on-the-Rennweg, Neuhaus-on-the-Rennweg, the miners' settlement of Schmiedefeld, and farthest in the distance, the Wetzstein of the Slate Mountains; to the east, the porphyritic Kieckelhahn, Meuselbach, and the Meuselbach crest; to the west, the Rhoe Mountains, the Kuppenrhoe Mountains with the basaltic mountains of the Oechsen, Dietrich, Fless, and Stoffelskuppe, behind the latter, Bayer and Milseburg, further, the "Heights" or the Plattenrhoe Mountains with the Wasserkuppe, before the latter the Rhoe foothills of the Werra Valley (Dolmar, Geba, Hutsberg); to the southeast, the Gleichberge of the Grabfeld and the spurs of the Franconian Jura Mountains (Staffelberg and Vierzehnheiligen). In the northern piedmont are the Saalfeld Culm, the ruins of Greifenstein, Leuchtenburg, Singer Berg, Steiger near Erfurt, and the Drei Gleichen near Arnstadt; on quite clear days Kyffhaeuser and Brocken are also visible.

Afforded such a view, it seems proper to look back into the geological past and to visualize the phases of the orogenesis, as well as the origin of the various mountain forms. In the central group of the Thuringian Forest, the old Slate Mountains, which were folded in the Carboniferous, are deeply covered with accumulations from the Rotliegendes era and above all by the lava and tuff of these accumulations. The entire central Thuringian Forest, which we view from here, was at that time a mighty bedded or cinder

volcano, the boundaries of which are unknown but which surely must have extended beyond the range of the mountains of today. The center of the crater is likewise not known. In regard to these Paleolithic aggradations, we must still conceive of the accumulations of the Zechstein and the Triassic at least. Still existing on the heights of the Thuringian Forest near Steinheid is a Bunter sandstone block. E. Zimmermann discovered a final remains near the Wegscheide in the proximity of Oberhof. At the same time, this researcher also estimated that the Terebratula bed must have lain above the Wegscheide in 1575. This same stratum crops out at the railroad station of Graefenroda at an elevation of 450 m. Accordingly, it may be assumed that the elevation of the mountains, or the subsidence of the piedmont, is 1,125 m. In which phases did this mountain-building process occur? The first upwarping probably occurred at the end of the Jurassic due to pressure from the northeast. Later there may have occurred a rejuvenation of old Hercynian-disturbance divisional planes and block faulting: on the southern and northern marginal dislocation (near Doerrberg it is of course only a case of flexure), on the Heidersbach, Kehltal, and Faubschloss crevice (Figure 11). The individual blocks were pushed together between the afore-mentioned faults to form a step fault, so that the northeastern blocks were invariably raised toward the southwestern, as is shown in Figure 8 (Zimmermann). The following period manifested essentially a degradation which resulted in a more or less levelled-off peneplain. In the most recent Tertiary, and perhaps also in the oldest Diluvium, there accordingly ensued a repeated uprising of the mountains on the marginal dislocations, due to which the present cliff of the mountains originated. The

uprising was nonuniform, i.e., stronger on the southwest margin of the mountains than on the northern side, stronger in the central part than in the remaining parts of the mountains, so that here the Tertiary degradation level lies higher than in the Slate Mountains. Erosion was reactivated by the final uprising. Consequent valleys, which run perpendicularly to the line of strike of the mountains, made their appearance. Between them there remained transverse ridges or interstream plateaus which are broad at the main crest but grow smaller after the margin of the mountains. Then later there occurred an erosive breaking-up of these interstream plateaus with the result that they were transformed into individual mountain peaks. Only then did degradation of the summit regions take place, in this instance in the marginal zone of the mountains. The great windfall catastrophe of 1946 brought damages to three-fourths of the forest here. However, an opportune planting of a young ash forest has been undertaken.

Now, back to the Schmucke inn, located at the highest human-inhabited settlement of a forest clearance of the Thuringian Forest (914 m). Here the roads lead from Zella and Suhl down to Elgersburg and Ilmenau. Once a stall for wild game, cattle house, or colt house in the middle of a great meadow for bulls, mares, and colts from the surrounding towns, today it has become a much-visited mountain inn. Native to the Schmucke is a number of montane and alpine varieties: *Athyrium alpestre*, (Arctic-alpine) *Imperatoria* (*Peucedanum*) *ostruthium* (montane), *Mulgedium alpinum* (montane-alpine), *Prenanthes purpurea* (montane-subalpine), *Rumex arifolius* (Central European to alpine). Representative of the lepidoptera is the rare, boreal-alpine *Agrotis speciosa*; of the coleopterons, the boreal-subalpine *Otiorrhynchis dubius*, of which

70 were established as such by Dr. Fiedler of Suhl. On the mountain brooks in the Schmuecke, growths of *Petasites albus*, *Ranunculus platanifolius*, and *Athyrium alpestre* are in evidence up to an elevation of 700 m on the Wasserstar. The Wasserstar rises to 700 m. The Gebirgsbachstelze rises up to 800 m. The peregrine, the thick-billed fir jay, the common buzzard, the black woodpecker, the ring dove, the mountain cock, and the wren fly as far as the crest.

In 1946 a hurricane caused immense damage (1.2 million m<sup>3</sup> of solid timber were blown down or broken). The ensuing bark-beetle plague deforested the greatest part of the surrounding heights. By means of a growing young forest plantation, the forestry administration attempted to create a mixed forest which would avoid the disadvantages of a purely spruce afforestation, as an "economic forest close to nature." Proceeding from the Schmuecke, we attempt to seek out still more geologically-interesting features on the southwest side of the mountains. By way of the Schmiedefeld road we walk about 150 m to the south and follow a glade over the Fichtenkopf in the southwest direction down into the stamping-mill area to the heaps of the former "Hirschzunge" mine where the kidney-shaped-ore-containing *Acanthodes* strata were mined. The kidney-shaped ores bear fahlerz, arsenopyrite, and chalcopyrite and manifest the fish petrifacts which are also present in the clay shale (*Amblypterus*, *Palaeoniscus*, *Acanthodes*) (see page 85). We now return to the Schmuecke and descend to the Sperber Brook where the brownish-red sandstone and Goldlauter conglomerates (rm 1) are exposed. Toward the end of the meadow there is an outcropping of *Acanthodes* clay shale with kidney-shaped ores in the brook bed. We follow the footpath on the right

bank of the Sperber Brook, and by descending we again attain the zone of brownish-red sandstone, and further on, the porphyry-conglomerate zone. Near the mouth of the Sachsendelle in the Sperber trough there is an old mining drift by means of which the Manebach strata were mined from two stone-coal veins. The way leads further through the upper porphyry of the Gehren level and further downward through micaceous porphyrite. (In contrast to the orthoclase- (potash-feldspar-) rich porphyry, this porphyrite contains plagioclase (lime-soda feldspar). If, in addition, mica flakes appear as xenoliths in the groundmass, it is called micaphyre.) There where the Sperber Brook discharges into the Frei Brook there is an outcropping of felsitic porphyry, i.e., rich in small xenoliths. In the valley of the Frei Brook we pass through micaphyre and porphyry of the Gehren level, as well as through sandstone of the Manebach level, to the Mordfleck meadow on the R which in late June is decorated with the glittering blossoms of *Arnica montana*, *Centaurea pseudophrygia*, *Leucorohis* (*Gymnadenia*) *albida*, *Phyteuma orbicularis*, and *Meum athamanticum*. We come to the Rennsteig railroad station (747 m), after walking over the porphyritic and porphyroid covers of the oldest Rotliegendes era (Gehren strata) close to the foot of the 944-m-high Finsterberg, a porphyritic residual knob. Highway No 4 (Hamburg-Erfurt-Ilmenau-Schleusingen-Coburg-Nuremberg), as well as the railroad line Erfurt-Ilmenau-Schmiedefeld-Schleusingen-Themar, pass over the col. The hamlet of Allzunah lies in a forest clearing (755 m) at the crossroads of the R and the road which leads from Stuetzerbach to Frauenwald, and on the branch railway line Rennsteig-Frauenwald. A glassworks erected in 1891, the Franzen Works, represented the inducement for the settlement of this hamlet. However, since this works was not capable of competing with the older Stuetzerbach



glassworks, it received the colloquial appellation "Die Allzunah" [the much-too-close one]. In 1785 this works was no more. The appellation was then applied to the hamlet itself. Located in the immediate proximity is the Herold spring; this spring is the source of the Schleuse. Up to the Dreiherrnstein (811 m), we remain in the zone of Rotliegendes volcanic cover (porphyrite and Stuetzerbach porphyry). The towering Grosse Hundskopf, close to the R, is a porphyritic residual knob. The peaty meadows near the Dreiherrnstein are the source of three rivers: the Schorte and Schobse which flow to the Ilm, and the Wilden Schleuse which flows down at the boundary of the Rotliegendes volcanic cover and the Lower Silurian quartzite. From the Dreiherrnstein, the R and the forest road lead for the most part through Lower Silurian quartzite, the greater part of which has been transformed into fleckschiefer. We find ourselves in the alteration zone of the Burgberg granite, the glowing lava of which altered or metamorphosed the old slate hull in the Upper Carboniferous. By close observation it is easy to recognize slate, quartzite, fleckschiefer, and granite in the fragments lying along the way. The R leads over the granitic boss of the Burgberg, the slate hull of which has long since been carried away by the forces of degradation. Neustadt-on-the-Rennweg (782 m) lies on porphyritic and porphyroid capping deposits of the Gehren step. The settlement of "Neuenstadt" near the Sluse (Schleuse), which presumably was settled because of the former copper mining, was first mentioned in 1489. Ancient shafts permit the assumption that mining was the inducement for the establishment of the first settlement; this mining has long since disappeared. The miners deserted the lonely heights, and the victorious, expanding forest transformed the settlement of human culture back into a wilderness.

The settlement of today originated about 1700. It formerly consisted of two village parts: the Meiningen and the Schwarzburg. Only after World War I was it possible for the two parts to consolidate into one political community as a result of the formation of Greater Turingia. For two centuries beech remained the stand-forming species. The extensive beech forests gave the inhabitants of this Rennsteig settlement the opportunity to gather corkwood fungus (*Polyporus*), the towlike inner part of which yielded "tinder fungus." However, when the forest began to change and the spruce became more dominant, "Schwamm-Neustadt" was obliged to import its raw fungus from the Alps and the Carpathians. A glass works was established in Neustadt in 1698. The glass-processing industry made its appearance as well. The match-making industry, which utilized the spruce wood of the forests, crowded out the fungus industry in the nineteenth century. After 1945 the match-making industry experienced a favorable development, and the "Rennsteig wood" manifests increased commercial possibilities at the present time. The citizens of Neustadt are also active in the glass industry. Near the Kahlert Inn a very old trade road, the Kahlert road, linked with the R coming from the direction of Eisfeld. Then, as did the Frauenstrasse road, which came from Schleusingen by way of Schleusingerneundorf, it coursed to Erfurt. The R now leads over extensive tuff. Near the Teufelsbuche, near kilometer stone 19, where a road branches off toward Altenfeld, the Lower Silurian phyllite appears to look out a window between the Rotliegendes tuff covers. Near kilometer stone 21.3 before the Schwalbenhaupt meadow we see a good exposure of tuff of the Gehren level. It is sandy, conglomeratic, and studded with large red porphyry fragments. The col of the Schwalbenhaupt meadow (770 m) permits a pleasant passage from the Schwarz Valley

into the Werra Valley. Goldlauter conglomerates and sandstones, as well as hard micaceous porphyrite of the Gehren level, are cut by the road on the slope of the Erster Berg. The mountain health resort of Masserberg with an extension of the Ophthalmological Clinic of the University of Jena for ophthalmic diseases and tuberculosis is situated in a col on sandstone and tuff of the same level (ru). This col likewise affords a convenient passage from the Schwarza Valley into the Werra Valley. The Eselsberg (841 m) and the Hohe Heide (831 m) with a Dreiherrnstein likewise consist of hard and very resistant Goldlauter conglomerates. From the tower of the Hohe Heide we again enjoy a magnificent view of the Franconian countryside. Not far away is the Werra spring which has been given a stone construction on the Zeupelsberg 76 m above sea level. We now find ourselves in the nucleus of the second great saddle of the old Variscian Mountains, the Schwarzburg or phyllitic saddle. Up to a point far above the Ernst Valley we wander over stony soils which do not manifest an abundance of forms, the oldest Silurian clay slate, or phyllite and quartzite. We find ourselves in the Slate Mountains proper. Here again a col -- that of the Ausspann (751 m) -- affords easy passage between the valleys of the Schwarza and the Werra. The R leads over the 838-m-high Pechleite to the small settlement of Friedrichshohe, which originated in connection with a glassworks and which was named in honor of Duke Ernst Friedrich I of Sachsen-Hildburghausen. On both sides of the lightly-rolling slate plateau lie numerous upland moors which developed on the water-impermeable, loamy, residual soil of phyllite in the presence of relatively heavy precipitation (up to 1,200 m). Hydrographically, the Dreiherrnstein and the Dreistromstein northwest of Siegmundsburg represent

the most remarkable point of the entire mountains between Saale and Werra. For approaching this point are the most extended ramifications of three rivers -- the Rhine, the Weser, and the Elbe. Under the chiseled emblems of the former sovereignties on the Dreistromstein we see the names of the water courses: on the east side, Gruempfen, Itz, Main, Rhine; on the west side, Saar, Werra, Weser; on the north side, Rumbach, Schwarza, Saale, Elbe.

Here, the other, the eastern source brook of the Werra has its beginning; it is to be considered the actual Werra source. The significant characteristic fossil *Dinobolus Loretzii* was found in the stone quarry behind Siegmundsburg. This discovery led to the classification of the strata, which were formerly classified as Cambrian formations, as Silurian formations. Siegmundsburg in a source trough and plateau situation is a young row settlement between the Hiftenberg, which is marked by its excellent whetstone slate, and the Saar upland moor. (Due to run-off pits, the upland-moor character of the latter has all but disappeared.) There was a bog-moss-rich low-shrub plant community with northern evergreens: *Adromeda polifolia*, *Vaccinium uliginosum*, and *V. oxycoccus*. Over the 730-m-high col near Limbach a road leads from the Schwarza Valley to Itz and crosses the road leading from Eisfeld to Neuhaus. An industrial district which was important for the surrounding forest villages arose here in the plateau-saddle region. A branch of the Greiner family of the forest (the founding father of which was Johann Greiner (the "Schwabenhans"), founder of the Lausha glass industry), represented by Gotthelf Greiner, founded, the porcelain industry here, independently of the two other sons of the Slate Mountains (Macheleid of Kursdorf and Boettger of Meissen and Schleiz). The father of Gotthelf Greiner was a glassmaster,

as were all his ancestors. Through the efforts of the son, a porcelain factory assumed the place of the glassworks in 1772. This porcelain factory was the first to appear in Thuringia, and its products soon gained far-flung fame, competing with the products of Berlin and Leissen. In 1939 the last traditional Limbach porcelain with the three-leaf clover insignia was drawn from the baking oven, the labor force was taken over by war industry, and the factory became the site of the Rauenstein armaments works. In 1945, after being subjected to the fire of American troops, it burned. After the great storm and bark-beetle catastrophe, the Limbach porcelain workers found employment in the forest. Here, many men work in the synthetic-fiber works (Wilhelm Pieck Works) in Schwarza, and many women and girls work in the Anna Seghers Tubeworks in the Kreis town of Neuhaus-on-the-Remnweg. Limbach became the end station of the shuttle-bus traffic for Schwarza and Neuhaus-on-the-Remnweg. On the former cabinetmakers' shop of the Limbach factory, one side of the roof of which sends the falling rain to the Rhine, while the other sends the rain to the Elbe, a tin shield with the three-leaf clover emblem and the year 1772 recalls the 167-year-old history of the industrial life in the forest of the Greiner porcelain factory, the oldest of its kind in Thuringia (as related by Mr. Guenther Weiss in Scheibe-Alsbach). An imposing industrial site arose at the crossroads in the Limbach saddle. In the immediate proximity, on the slope of the Petersberg, stands a monument to the noble philanthropist, Gotthelf Greiner, who did so much for the economic development of the poor forest population. The knotty independence of the populace inspired the poet Otto Ludwig to the creation of a Limbach novelette, which did not pass the outline stage, however. We leave for a short time the R in order to follow the Neuhaus

road to Steinheid, the old mountain village on the Steinerne Heide on a plateau-spur on the Kieferle, "Unserer lieben Frauen Berg." This imposing mountain represents a quartzite residual knob on the old peneplain of the mountains. The settlement was mentioned for the first time in 1482. Here, already before 1528, stood one of the chapels dedicated to the Mother of God in which those who made pilgrimages to Rome or Jerusalem received "blessed passage." The coat-of-arms of the formerly densely-populated "free mountain town" is characteristic: an image of Mary with the Christ child in her arms, and at her feet a shield depicting a sledge and iron as tokens of the local mining.

Before the Thirty Years' War, gold mining was carried on at these heights. The quartzite of the Petersberg was auriferous. The mineral springs of Steinheid were also famous in the Middle Ages; these springs presumably came down from the nearby Zechstein strata. When gold mining subsided, the people turned to the mining of whetstones on the Hiftenberg. The "mountain town" was quite poor. At an altitude of 820 m above sea level, cultivation (barley) is carried out only on an inextensive basis. Here, spring wheat no longer ripens. Even potato cultivation has strongly receded, due to nematode infestation. Steinheid took the road to recovery only when the glass and porcelain industries were introduced. Today Christmas-tree ornaments and glass pearls are produced. Many also found their livelihood in the nearby porcelain factory at Limbach. The glass industry is endangered by the industrial obstruction. The Neuhaus road leads past a highly significant rock exposure which permits a glance into the geology of the local region. Due to degradation, the once wall-steep, yellow sandstone rocks on the Sandberg near Steinheid have collapsed. Here, on the Hercynian

fault a Zechstein and Bunter sandstone fault block has become stranded in the Lower Silurian quartzite and phyllite. It has thus remained protected from complete degradation (denudation remnant). (Cf. Figures 22 and 23.) On the road there is an outcropping of kaolin-rich Middle Bunter sandstone; following in the direction of the Schwarza spring are Lower Bunter sandstone, limestones and dolomites of the Upper Zechstein, and dolomite of the Middle Zechstein. This geologically-important relic indicates that the old Slate Mountains were once covered by Zechstein and Triassic formations. Later, the sand deposits became very important for the "forest industry." For originally both the glass and the porcelain industries were dependent on local raw materials: the former on the sand deposits; the latter on the kaolin deposits which can no longer be mined remuneratively. Nevertheless, both industries are labor-oriented and bound to an ingenious, industrious, and formative race of men. Behind the sandstone quarry, we come to the Sandwieschen, the old pass over which traffic formerly ran from the Schwarza Valley to Lauscha and Steinach. The Rennsteig is again attained by way of the Staat road, and it leads us from here to the Rollkopf. Before us lies the Schwarza Valley with the newly-constructed Schwarza Dam. Appearing picturesquely in the background is the forest village Scheibe-Alsbach. The dammed lake lies at an altitude of 666 m and comprises the quantity of water of an intake region ( $3.24 \text{ km}^2$ ), above the area of the earlier Floss Pond. At the same time, this lake checks the dangers represented by high waters and melting snow. A quantity of water great enough to compensate for the lack of water in the dry months is to be stored in this lake. The valley dam was built in the period 1937-1942.

Structural dimensions: water surface, 23.0146 ha; depth, 16 m; volume, 1.8 million m<sup>3</sup>. The dam consists of a tamped earth fill with a clay nucleus (clay from the Upper Zechstein formations). On the lake side it is provided with stone plaster; on the outer side it has a grass cover rich in globe flowers. This lake, which is situated in a densely-wooded spot near the old Rennsteig, signifies a great landscape advantage for Scheibe-Alsbach and Steinheid. It likewise justifies hoping that both forest villages can develop into health resorts. The dam lake is also important for the fishing industry. The breeding of trout, carp, and tench has already shown good results (as related in a letter from Mr. Guenther Weiss of Scheibe-Alsbach). Again we leave the Rennsteig, in order to have a last view of the Schwarza Valley from the newly-erected forest hut, the "Waidmannsheil." Past the long-since extinct glassworks settlements of Habichtsbach and Gluecksthal, we attain Neuhaus-on-the-Rennweg. On a high-lying forest clearing three very young settlements have consolidated into one: the hamlet of Schmalenbuche (named after the "beaked beech," according to Freysoldt), which arose in connection with a glassworks in 1607; the plateau row settlement of Igelshieb, the highest-lying Thuringian mountain village (838 m), which was settled in 1648 from the original huts of the charcoal burners who settled here after the great forest fire; and the row settlement of Neuhaus-on-the-Rennweg, which originated with the hunters' hut of the counts of Schwarzburg. Today these three communities form the glass-blowers' city of Neuhaus-on-the-Rennweg (population 5,000), which developed into the center of the production of wax pearls, mollusk pearls, ampules, and scientific instruments. The inducement for the production of the latter is attributed by the industrious local people to their great son,



Heinrich Geissler of Igelshieb. The name of this university glassmaster and honorary doctor lives on in the Geissler tubes which of course were named in his honor. The Anna Seghers Works produces conduits for radio and telecommunications installations, among others. The porcelain factory of Neuhaus-on-the-Rennweg is located at the end and the highest-lying spot of the "ceramic valley channel of Graefenthal and Wallendorf." The high-lying town which affords such a long-range view is a much visited mountain-air health resort and winter-sports center. Moreover, it has recently become the capital of the mountain Kreis of the same name. To an extent of more than 800 m, the land is almost exclusively devoted to forestry. Cultivated fields and meadows are present only in limited extents, and the yield is only slight. Thus, the opening of the mountain railway, the highest-situated rail line, was of great significance for Neuhaus and the surrounding villages of the heights. By means of this railway, more favorable living conditions were created for the foresters who must ordinarily struggle for their existence, and the import of coal, raw materials for industry, and foodstuffs was made possible. (Cf. page f.) The excursion from the railroad station of Ernstthal (769 m) is still quite monotonous. Phyllites and quartzites of the oldest Silurian formations form the topography which harbors dark, silent spruce forests with the bilberry and the Haller reed grass as vegetal cover; whereas mat grass and Hercynian "Felsabkraut" hem the forest path. From the forest clearing one has a view of the Froebel tower near Oberweissbach (dedicated to the memory of the great Thuringian educator), and of the high-lying settlements of Schmiedefeld and Neuhaus-on-the-Rennweg. The rock is of different formation in the pencil-slate zone of the Silurian formation on the Brand (819 m). Here, a footpath leads from the <sup>n</sup> to a deserted quarry situated on

the slope to the right. The stone is clay slate and has pencil-slate-like fissibility. From the slate heap we enjoy an attractive view of the Olsegrund with the village of Hasental. A second deserted quarry lies to the left of the R. The causes of the pencil-slate-like fissibility are easily recognizable in the stratification and foliation which are vertical to one another. We have entered the peneplaned trough of the Slate Mountains. Near the Brand Inn we follow a forest path down to the Piesau road and proceed further to the Teufelskanzel. There where the Piesau road bends sharply there is an outcropping on a fault of Lower Silurian leather slate beside older Cambrian quartzite. In the environs of Graefenthal the leather slate forms picturesque rock bastions and fallen stones which are of particular grandeur and beauty here in the source of the Arnsbach Valley on the Teufelskanzel. A hundred or more years ago the mining of Silurian alum schist and vitriol slate was still remunerative in this forest valley which is distant from communication. A deep and steep forest ravine, flanked by wild rocks of leather slate, leads down to the valley region. The forest brook splashes with cheerful sounds over the slaty stone. Warmth-adapted plant varieties grow on the sunny, slaty slopes up to the higher-lying parts: *Digitalis ambigua*, *Teucrium scorodonia*, and *Cytisus nigricans*. (The Arnsbach Valley was described as a protected-landscape region.) We go back to the Spechtbrunner road which follows the R for a stretch, leading to a clearing which affords a long-range view and to the old mining and carters' village of Spechtsbrunn which developed in a saddle zone. The old slaty plateau is strongly channeled. From the saddle pass, the valley of the Buch Brook with the village of Buchbach leads down to the extensive longitudinal valley in which Graefenthal lies. An old people's and trade road, the Leipzig (or Juden) road,

followed the valley of the Buch Brook, then ascended on the other side of Graefenthal to the slaty plateau, finally leading further to Saalfeld. The slate quarry which lies opposite in the Carboniferous slate is the "Tannenglueck" Mine, to which we shall yet pay a visit. Another pencil-slate quarry lies on the slope of the Rams Valley; this we see before the ascent to Spechtsbrunn. We now follow the field path which comes from the north and which leads along on a slope which consists of thick-layered quartzite and large-noded calcareous slate of the Devonian formation. Blue Cypridina clay slate lies about along the way. Quartzite and nodular calcareous slate crops out along the way -- the latter in a rock 2 1/2 m high. The nodes are weathered out, and "Tortula-Moosraeschen," wall rue, rounded-leaf bell flowers, and spring Potentilla have taken root here.

We now return to the road and proceed via it to Spechtsbrunn. In the middle of the village, before a house on the street behind the Kalte Kueche, there is an outcropping of graptolite slate; there is an outcropping of Silurian ocherous limestone on the field way to Graefenthal. On the way to the Kalte Kueche we see fragments of neritic slate of Devonian formation lying about. Worm-shaped impressions, which can be considered relics of fuci or tracks of worms, are rarely found. The old trade road, which came from Nuremberg via Bamberg, Coburg, Neustadt, Koeppelsdorf, and Judenbach, reaches the R near the Kalte Kueche, and leads from here down the Buchberg to Graefenthal. From the Kalte Kueche we make an excursion to the Tannenglueck Mine where the soft clay slate of the Carboniferous formation was mined for roof and plate slate. In the eastern part of the quarry one can observe the so-called kieskaelber, kidney-shaped accumulations

of quartz and iron pyrites. Geologically, the further Rennsteig excursion is again quite monotonous. There are frequent outcroppings of the soft clay slate of the Carboniferous trough. The spruce mountain forest is likewise monotonous. The true accompanying vegetal growths of the spruce are *Potentilla erecta* (tormentilla), *Blechnum Spicant*, *Calamagrostis Halleriana*, *Senecio nemorensis* *Fuchsii* in large numbers, and the afore-mentioned *Lycopodium clavatum*, *anotinum*, and selago. *Digitalis purpurea*, *Epilobium angustifolium*, and waving, golden-shining stands of *Aira flexuosa* decorate the open spaces of the forest in which woodlark and "Baumpieper" sing during the day, while the goatsucker buzzes in the evenings. Jay, songthrush, misselthrush, ring dove, wild pigeon, green woodpecker, large-spotted woodpecker, wood owl, horned wood owl, bullfinch, spruce crossbill, fir titmouse, crested titmouse, and the two types of golden-crested wren enliven the lonely spruce forests. In the winter the following fly through these mountain forests: fieldfare (juniper thrush or "Ziemer" thrush), ring thrush, redwing, Siberian fir jay (which was often observed in the Slate Mountains and near Stutzer Stuetzerbach), northern bullfinch, and northern silktail. In the ancient leveled-off region, a certain relief from the monotony is afforded by the flat valley heads of the brooks which soon, however, are transformed into deeply-ravined valleys on the south side, due to the mighty rising of the mountains. Multi-variety, spicily fragrant mountain meadows decorated by the countless saffron-colored blossoms of the arnica, white-blossomed daisies, delicate blue bell flowers, in addition to potato and oats fields, have taken possession of these valley heads and forest clearings in the ridge region. There where the source troughs of the Hasslach and Loquitz approach each other, another convenient crossing place over the mountains is afforded.

At the crossroads of the highway which uses these valleys and the R, an obelisk indicates the watershed between the Rhine and the Elbe river regions.

"You speak foolishly, if you say you walk on the Rhine:  
Here, right; here, left! Here is the South of Germany;  
there, the North.

When here the snow melts, its water flows to the Main;  
That which reaches the valley, flows off to the Elbe."

--Viktor von Scheffel

Near the railroad station of Steinbach am Wald (583 m), the R leads over a main traffic artery of the Reich -- the Berlin-Munich line. Here, in the saddle between both communication lines -- on the highway and the railroad -- a special village part of Steinbach has developed, due to such a favorable location in regard to communication. For here it was possible for porcelain and glass industry, as well as a great sawmill, to settle, offering employment to the inhabitants of the nearby mountain villages. Moreover, the communication lines assure rapid transport of raw materials and industrial products. The R then leads over the 732 - m-high Kiesslich, past a decorative Dreiwappenstein near the Loquitz source, to the hunters' hut at the foot of the Wetzstein. Here, two important structural lines of the mountains separate. The Carboniferous slate and quartzite strike in a Variscian-like direction from the southwest to the northeast between the Kalte Kueche and the Rodach springs. Also striking in this direction is the quartzite residual knob of the Wetzstein (792 m), which, however, is sharply cut off by a Hercynian fault line which runs from the southeast to the northwest (Figure 24). Running transversely to the Variscian-like striking Carboniferous trough is the

Hercynian-striking "Franconian Forest transverse anticline," to which belongs, for example, the Wetzstein and the great slate quarries near Lehesten -- the "VEB Slate Mines" (the Schmiedebach Works, formerly the Oertel; the Lehesten Works, formerly the Staatsbruc bruecke; and the Roettersdorf Works, formerly the "Kuehler Morgen.") We now ascend the look-out tower which is located only 1 km from the hunters' hut, and enjoy an informative view of the Slate Mountains and the far distance beyond. Senilely, the geologically-ancient, lightly-undulating peneplane extends far out, similarly to the image of a petrified play of waves. Franconia is visible in the distance with the jewels of its landscape: the Coburg and Heldburg castles, the pilgrimage places of the Northern Franconian Alb Mountains; Viehzeinhelligen; Banz and Staffelberg. Individual residual knobs of quartzite -- the Wetzstein and the Lehesten Culm -- and the many diabasic knobs, such as those of the Lobenstein Culm, project over the slate plateau. Further on, the old peneplain is covered with coniferous stands in its quartzitic zone up to the extensive forest clearing of the settlement located in the plateau syncline. Its geophysionomy is characterized by blue-black slate. We find ourselves in the region of the roof-slate quarries which represent the most striking landmarks of the landscape in the clay-slate zone around Lehesten extending in front of the Wetzstein. From this high level we have a view of the state slate quarries and the even larger Oertel quarries. The houses and churches in Lehesten and the surrounding villages are encased in slate. The slate town of Lehesten developed from a village laid out along one street in a source trough of the 600-m-high peneplain and on a branch of the Nuremberg road; it ultimately became the center of the German roof-slate industry. To the northeast lie the village of Weitisberga and the geologically

noteworthy Hennberg (Hainberg), the granite of which altered the Carboniferous slate. With this establishment, definite ascertainment was made for the first time of the age of the granite, which rose up after the aggradation of the Carboniferous clay slate and during the period of the upfolding of the latter into the cavities resulting from the folding. The R leads through the small mountain village of Brennersgruen, which was named in honor of the bailiff Brenner who bought the manorial estate himself. Now, over the Hohe Tanne (722 m) with a beautiful Drei-wappenstein, past the village mountain of Grumbach located in a source trough, to Rodacherbrunn. The inhabitants of these lonely settlements are either employed in the nearby slate quarries or as forest workers; however, in addition they carry on small-scale farming on 3-to 4-ha plots. Stands of beautiful, variegated *Cirsium heterophyllum* grow along the R, even blooming forth from diabasic debris along the way. Near Rodacherbrunn the Carboniferous trough ends, and the Franconian Forest or eastern Thuringian saddle begins. There where the R, east of Rodacherbrunn, again links up with a ballasted road, we walk over a zone of diabasic tuff, which crops out in the dells along the way, and a zone of several smaller and larger diabases. About 150 paces before the linkage point of the R to the road which comes from the Jaegersruh there is an outcropping of Devonian slate in the forest fault troughs beside a path used by wood carters. We follow this road, rather than the R, and shall be able to study the diabase which is separated in pillows or orbicules on a small hill in an old quarry. These pillows or orbicules are original igneous formations, not products of disintegration. Moreover, here the diabase is of a variolitic texture and contains divergent, fibrous feldspathic pellets (varioles). The Lobenstein Culm

(728 m) represents a beautifully-formed diabasic knob which is seated on the old plateau. The excellent diabase is broken up in a large stone quarry; it is principally used for bridge constructions and stone steps. A beautiful, still quite natural-appearing mixed forest -- a great rarity in the Slate Mountains -- covers the knob. The mineral-rich, loamy derived soil provides not only favorable growing conditions for beeches, but also favors a lush flora: *Impatiens noli tangere*, *Mercurialis perennis*, *Senecio Fuchsii*, *Milium effusum*, *Melica uniflora*, *Stachys silvatica*, *Phyteuma spicatum*, *Cardamine impatiens*, *Actae spicata*, *Polygonatum verticillatum*, *Cardamine bulbifera*, *Asperula odorata*, and high and low ferns (*Aspidium filixmas*, *Phegopteris polypodioides*, and others, all of which form plant communities). A visit to the Sumpf meadow of the Gemaessgrund, of which several rarities are characteristic, is rewarding: the insect-catching plants *Drosera rotundifolia* and *Pinguicula vulgaris*, and *Eriophorum vaginatum*. Here we again see an outcropping of Lower Silurian Phykoden quartzite on the Kraehenberg behind the small mountain village of Schlegel, as well as numerous exposures on the way to Kiessling. From here we see the three high-lying settlements of Lichtenberg, Blankenberg, and Berg. Near Kiessling there is still another outcropping of Lower Silurian Phykoden slate which forms the nucleus of the saddle. In addition, there are outcroppings of Devonian tentaculite slate and diabase in the direction toward Blankenstein, appearing as anticlinal limbs on the way down to Blankenstein.

Thus, we have now ended our excursion. With observing eye we have followed the old mountain path for a distance of 168 km from the Hoersel to the upper Saale, having examined the local region which is afforded natural protection by the landscape. The geologic



Paleozoic times, which were of decisive significance for the formation of the landscape, for the developing animal and plant life, as well as for the establishment of human settlements, were a vivifying force. It is with pride that we take part in the victory of mankind in its struggle for existence on this manifoldly poor mountain block which formed a heritage in an unrelenting natural selection. Unpretentiousness, spiritual mobility, ingenious spirit, artistic plasticity, a longing for the homeland and for remote places, which caused transients to seek their homeland again and again -- these are the predominant characteristics of these forest workers of Franconian and Thuringian stock, for whose racial essence the Fennsteig, approximately from Limbach to the Grosser Inselsberg, represents the boundary line. In spite of this, the people of the forest-mountain are distinguished intrinsically from the piedmont inhabitants and the settlers of the old free lands of Thuringia and Franconia. Even though the northwest (where the mountain path is actually a ridge way, leading through a natural beech forest) tempts us with the magic of the Wartburg and the forcefulness of the forested mountains, all manifesting a variety of forms, the plateau of the central and southeastern part for its part is not without charm. In the mountain air which is laden with the odor of resin, we wander inspired through the darkly silent forests to stand in awe before the blossoming wonder of the summery mountain meadows. If we have learned to wander susceptible to impression, there opens everywhere before us the miracle of existence and the coming into existence which remain the great mysteries of all times. Inexhaustible are the stimuli, the inspirations, the impressions to be derived from such an excursion. From learned perception, we

turn, as to a legacy, to the words of Heinrich Wilhelm Eichl: "If we no longer need dry wood to warm our outer person, the more we require green wood to warm our inner person."

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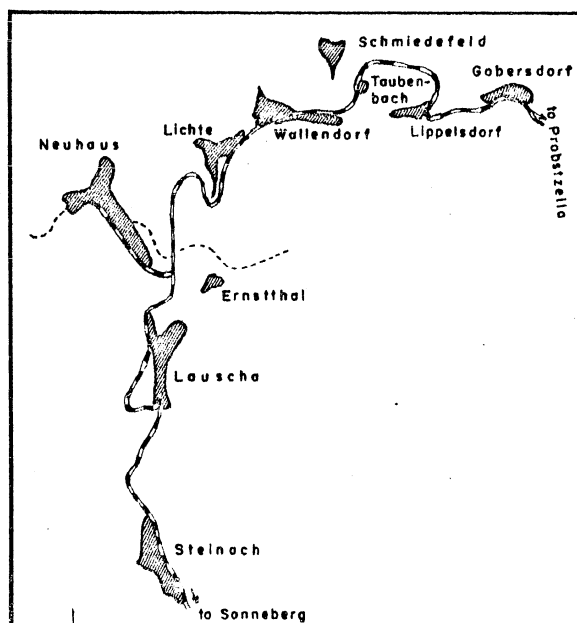


Figure 3. Rail line Lauscha-Wallendorf (1:100,000).

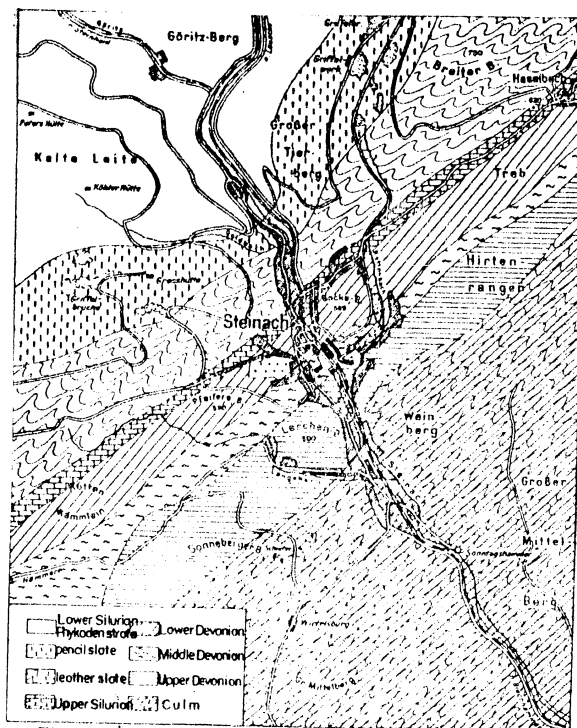


Figure 4. Steinach and environs: 1:35,000.

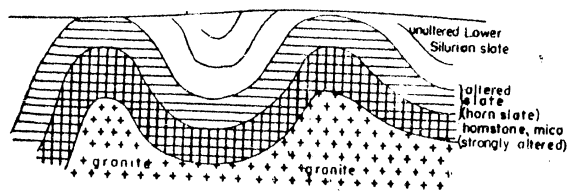


Figure 5. Contact metamorphism (schematized).

- 121 -

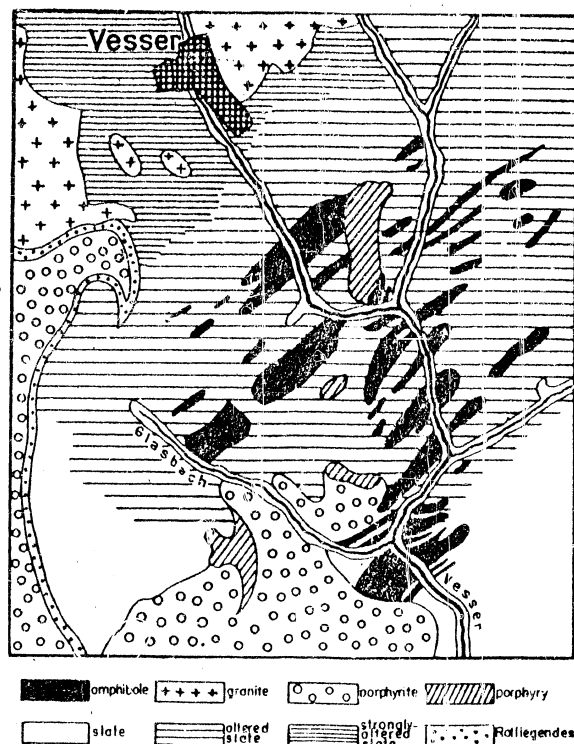
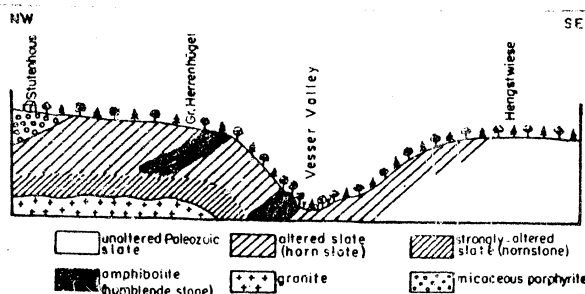


Figure 11. Geological map of the upper Vesser Valley (simplified, 1:18,720).



Beech-silver fir forest of the lower Hercynian step  
 Damp stone-blick forest on the Vesser; sycamore,  
 winter linden, ash, beech-fir; on the brook, white  
 pestilence wort, umbelliferous cow chervil

Figure 12. Profile of the Stutenhaus-Kengstwiese area (length greatly increased, 1:18,700).

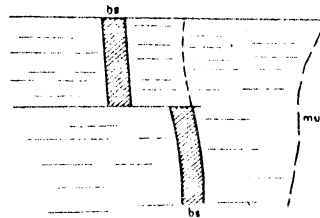


Figure 13. Basaltic eruption near the Hoerschel railroad station.

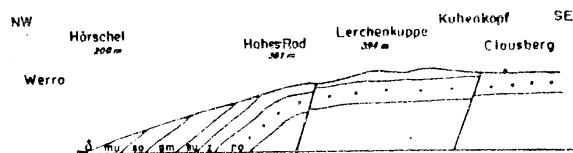


Figure 14. The Rennsteig between Hoerschel and Clausberg (greatly simplified). Length: 1, Length: 1:130,000; height: 1:175,000.

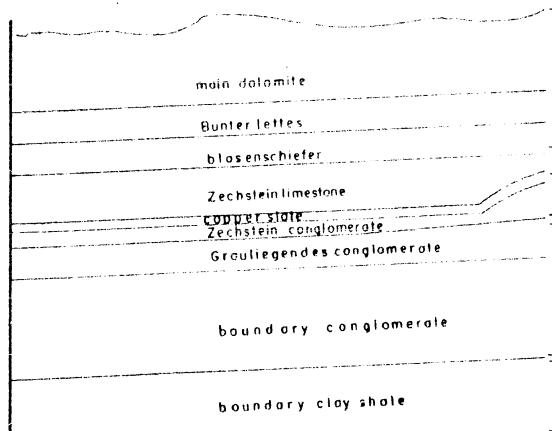


Figure 15. Profile near the railroad station of Foertha. (From E. Naumann.)

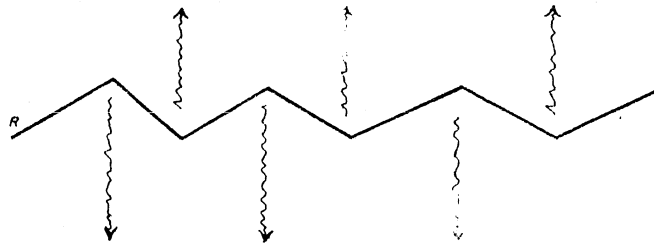


Figure 16. The struggle for the watershed on both sides of the Rennsteig.

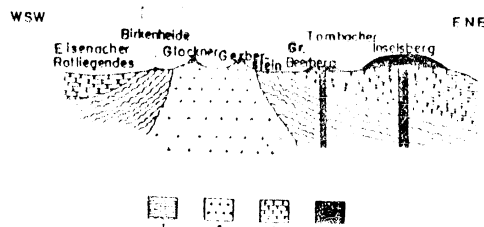


Figure 17. Profile of Birkenheide-Grosser Inselberg (simplified).

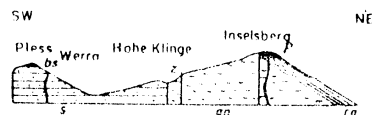


Figure 18. Profile of Pless-Inselberg (simplified).

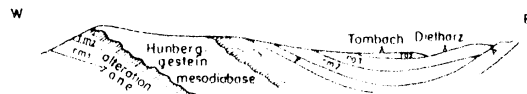


Figure 19. Profile of Huchberg, Tambach, and Dietharz. (1:25,000).

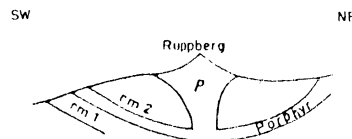


Figure 20. Profile of the Ruppberg (simplified).

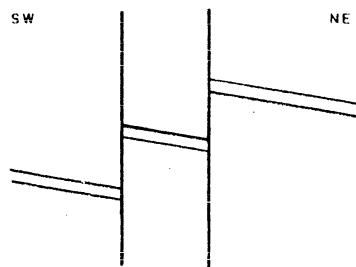


Figure 21. Step-formed block faulting.



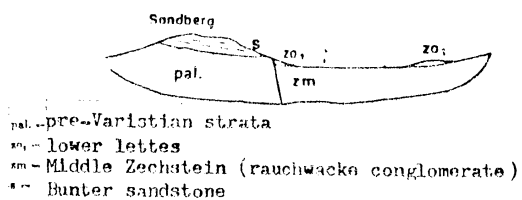


Figure 22. Sandstone residual block, according to Chun Yu Lee (1:5,000).

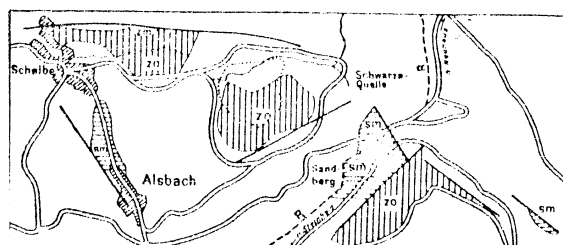


Figure 23. The residual blocks near Setin Steinheid and Scheibe-Alsbach, according to Chun Yu Lee, 1940. The circle of dots signifies the area of the dam lake. 1:47,500.

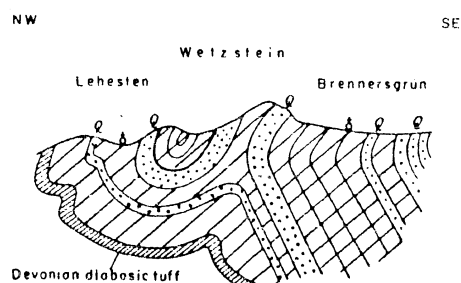


Figure 24. Profile of the Wetzstein, showing the overfault of Carboniferous slate and quartzite. (According to E. Zimmermann; length and height: 1:25,000.)

Page 93  
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